FLOOD PLAIN MANAGEMENT STUDY

WALNUT CREEK

Fairfield County

Ohio

In cooperation with the

Fairfield County Commissioners

and the

Ohio Department of Natural Resources

United States Department of Agriculture

Soil Conservation Service

Columbus, Ohio

September 1983

FOREWORD

The contents of this report are intended to serve as a technical base for making local flood plain management decisions. The actual legal aspects of implementing a flood plain management program, however, are beyond the scope of this study.

The state and local units of government, as well as the general public, will benefit from the increased knowledge concerning flood hazards along Walnut Creek and its tributaries.

Flood Plain Management Study
Walnut Creek
Fairfield County, Ohio

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INTRODUCTION

On March 28, 1980, a request for a flood plain study of the Walnut Creeek Watershed was made to the Ohio Department of Natural Resources (ODNR) by the Fairfield County Commissioners. The ODNR requested the Soil Conservation Service (SCS) to carry out the technical phases of the study.

The SCS and ODNR entered into a Joint Coordination Agreement on June 20, 1972 for the purpose of conducting flood hazard studies. Legal basis for the involement of the ODNR is found in Sections 1501.20, 1521.04, and 1521.14 of the Ohio Revised Code. The SCS performs flood plain management studies under the authority of Section 6 of Public Law 83-566, in response to Recommendation 9(C) of the House Document No. 465, 89th Congress and Executive Order 11988 dated May 24, 1977. A plan of study outlining the responsibilities of the participants, the specifics of the analysis, and basis for funding was approved by SCS, ODNR, and the local sponsors in July 1980.

The study sponsors have expressed their support for proper land use planning and flood plain delineation. The definition of the flood hazard areas will enable the local units of government to initiate land use and development regulations within the flood plains consistent with the identified hazards. The development of an effective flood plain management program for the study area is a main concern to the ODNR and the local sponsors. This report will provide the technical data base required to implement this program.

DESCRIPTION OF STUDY AREA

The Walnut Creek watershed is located in northern Fairfield County, Ohio, approximately twenty five miles southeast of Columbus. (See Vicinity Map.) The watershed is in the designated U.S. Water Resources Council Region 05 (Ohio River), subregion 06, and is within U.S.G.S. Hydrologic Unit 05060001. The downstream limit of the study is the Fairfield-Franklin County line with a drainage area at that point of 146 square miles.

Walnut Creek flows from east to west across northern Fairfield County. The stream continues on through Franklin and Pickaway Counties emptying into the Scioto River north of Circleville. The study area is limited to the watershed upstream of the village of Canal Winchester. All of the streams studied in this report are in Fairfield County, although a small portion of the watershed lies in Licking and Perry Counties.

The watershed is predominantly agricultural in nature, however, significant suburban residential development has taken place in the last fifteen years. This development is occurring mainly in the northwestern portion of the watershed on the fringe areas of the city of Columbus. The following five villages are located in the watershed: Baltimore, Carroll, Pickerington, Pleasantville and Thurston.

The climate of the area may be roughly characterized as "continental" in character in the sense that seasonal temperature fluctuations are moderately wide and annual precipitation attains a peak in early summer when thunderstorms become more common. Mean monthly air temperatures range from 31.9 F in January to 76.4 F in July. Mean monthly precipitation ranges from a low of 2.1 inches in October to 4.6 inches in July. The average annual precipitation is approximately 39 inches (Reference 8).

The flood plain soils along Walnut Creek are mostly light colored silt loam and loam soils formed in alluvial deposits. They include somewhat poorly drained Shoals, moderately well drained Eel and well drained Genesee series. Dark colored, poorly drained Sloan and Montgomery soils occur in depressional areas of the flood plain. Most flood plain soils in the watershed are well suited to agricultural purposes. (See Reference 10 for more detailed soil information.)

This study includes 37.0 stream miles along Walnut Creek and its tributaries. The study limits and stream lengths are listed in Table 1. All stream reaches were studied at a detailed level of intensity to determine actual flood elevations and floodway widths. Table 2 shows the 100-year flood plain area for the study area.

Table 1: Study Limits

Stream	from	to	Stream length (miles)
Walnut Creek	Franklin-Fairfield County Line	Railroad west of Thurston	21.3
Poplar Creek	Walnut Creek	State Route 204	8.0
Pawpaw Creek	Walnut Creek	Kumler Road	2.2
Pawpaw Tributary	Pawpaw Creek	Cherry Lane	0.2
Baltimore Tributary	Pawpaw Creek	Roley Road	1.4
Little Walnut Creek	Walnut Creek	Richland Road	3.9
		Total	37.0

Table 2: 100 Year Flood Plain Area

Reach	Area Flooded (acres) Agriculture Land	Urban Land
Walnut Creek		
From Cross Section WC2 to Junction with Poplar Creek	1,893	----
From Junction with Poplar Creek to Junction with Pawpaw Creek	685	----
From Junction with Pawpaw Creek to Junction with Little Walnut Creek	362	128
From Junction with Little Walnut Creek to Upper Study Limit	195	----
Poplar Creek		
From Junction with Walnut Creek to Upper Study Limit	406	----
Pawpaw Creek		
From Junction with Walnut Creek to Upper Study Limit	36	106
Little Walnut Creek		
From Junction with Walnut Creek to Upper Study Limit	295	----
Pawpaw Tributary		
From Junction with Pawpaw Creek to Study Limit	10	----
Baltimore Tributary		
From Junction with Pawpaw Creek to Study Limit	43	22
Sub-Total	3,925	256

Total 100 year flood plain area = 4,181 acres.

U.S.DEPARTMENT OF AGRICULTURE

SOIL CONSVERVATION SERVICE

FLOOD HAZARD STUDY AREA
VICINITY MAP

WALNUT CREEK
FAIRFIELD COUNTY, OHIO

SOURCE:
1978 GENERAL COUNTY HIGHWAY MAPS AND INFORMATION FROM S.C.S. FIELD PERSONNEL

USDA-SCS-FORT WORTH, TEXAS 1982

0 1 2 3 4 5 6
SCALE OF MILES

OCTOBER 1982

NATURAL VALUES

Walnut Creek and its tributaries flow through high intensity agriculture land planted to corn, soybeans, and wheat. Most of the flood plain is fall plowed, while the steeper uplands are mainly spring plowed with a growing emphasis on conservation tillage.

Modern agricultural practices are resulting in a decrease in wildlife habitat due to a loss of pastureland, wood lots, fence rows, and odd areas. The small acreages of woods and pasture are located on poorer, less productive sites.

The well vegetated streambanks provides an environmental corridor in an area of decreasing wildlife habitat. The primary species in the watershed are bob white quail, squirrel, opossum, raccoon, pheasant, skunk, deer, woodchuck, fox, muskrat, and mink.

Another concern is the acreage of prime farmland lost to urbanization in the northwest portion of the watershed. In the past 8-10 years, suburbs from Columbus have expanded into the surrounding farmland.

There are no reported sport fisheries in the watershed. Industrial pollution has lowered water quality in Walnut Creek but a good diversity of aquatic organisms still exist.

Wetlands are insignificant in the watershed. They consist mainly of flood plains, hillside seeps, and farm ponds of limited value to wildlife.

The Indiana bat (Myotis sodalis) is the only federally listed threatened or endangered species that could be located in the watershed. No known records of the bat exist for the area.

FLOOD PROBLEMS

The primary flood water damage along the streams studied in this report is to agricultural crops. There are 3,925 acres of agricultural land in the 100-year flood plain. Approximately 87 percent of this area (3,415 acres) is cropland, primarily producing corn, soybeans, small grains and hay. The average annual flood damage for this area is estimated to be $75,000.

Urban flooding in the study area is limited to the village of Baltimore. This is generally of the nuisance type with some yard and street flooding. However, operation of the village sewage treatment plant is interrupted periodically due to flooding.

There are presently large, undeveloped flood plain areas within and immediately adjacent to the village of Baltimore. The sponsors recognize the need for land use regulations to control development in these areas and to prevent future flood losses.

The northwestern portion of the watershed near the village of Pickerington has experienced a tremendous amount of residential development in the last ten years. This is a fringe area of Columbus and will probably continue to grow. A Flood Plain Information Study of Sycamore Creek and tributaries was published in 1975 by the ODNR (See Reference 11). This report delineates the flood plains of Sycamore Creek, Willow Run, and Beal's Run and is being used as a basis for land use decisions along these streams.

Streambank erosion is occurring along some areas of Walnut Creek and tributaries. Log jams and fallen trees in the channel have contributed to this problem by forcing flood flows against the streambanks and undercutting slopes.

EXISTING FLOOD PLAIN MANAGEMENT

Residents of the unincorporated areas of Fairfield County are eligible to purchase flood insurance through the emergency phase of the National Flood Insurance Program. The villages of Baltimore and Carroll are presently not participating in the flood insurance program but do have the option of joining at some later date. The Fairfield County Commissioners have adopted a building code for flood plain areas which restricts usage of flood plains for building sites. These regulations are designed to meet the requirements of the National Flood Insurance Program.

The Fairfield County Commissioners adopted subdivision regulations on November 6, 1973 to prevent inordinate development in the flood plains of the county. The Fairfield County Regional Planning Commission approved and adopted the same on December 4, 1973. Revised subdivision regulations have since been prepared for Fairfield County. They became effective on September 13, 1976. The design and requirements of the Fairfield County Subdivision Regulations contain specific requirements relative to "Land Subject to Flooding." These areas are defined and zoned primarily by soil series. However, detailed flood hazard studies, upon their receipt, take precedence over soils information for identification of flood plain areas.

The basic authority for municipalities to use subdivision regulations stems from Article XVIII, Section 3, of the Ohio Constitution, which is frequently called the "Homerule" clause. County use of subdivision regulations is an extension of state regulatory powers. Specifications of the powers of municipal and county governments and of the procedures to be followed is found in the Ohio Revised Code, Sections 711.001 to 735.26.

Various townships have adopted the Model Township Zoning Resolution prepared by the Fairfield County Regional Planning Commission. This zoning resolution can be used to protect existing flood plains from future encroachment and maintain their natural function.

In Ohio, flood plain management has two major goals:

1. The prevention of further development that is incompatible with the flood hazard.

2. The relief of persons who have unknowingly or unwisely located their residence or businesses in areas of flood hazard.

ALTERNATIVES FOR FLOOD PLAIN MANAGEMENT

Regulation of flood plain development presents the best opportunity for preventing future flood losses in the study area. There is presently very little development in the flood plain. Local officials can use this report as the technical basis for administering flood plain zoning and thereby regulate development in flood hazard areas. Preventive measures are always much less costly than corrective measures. In the State of Ohio, local units of government have the exclusive responsibility for controlling land use. Therefore, the counties, townships, and/or municipalities must take the initiative to enact the necessary regulations to control flood plain development. The Ohio Department of Natural Resources is available to provide assistance to local communities for developing a flood plain management program.

Regulatory measures may include one or more of the following:

1. Zoning - Flood plain zoning regulations can be used to control what uses are made of the flood plain, what specific activities or developments can take place, and how these activities or developments can be conducted. Flood plain zoning is the most widely used regulatory tool and the one with the broadest application. It can assure that the flood plain is maintained for its natural function.

2. Subdivision Regulations - Subdivision regulations offer a very useful device for controlling flood plain use in areas not yet developed. They may require that the flood plain areas be clearly identified on the plat map, which would serve as a warning of the flooding potential of the vacant land to prospective land buyers.

3. Other Regulatory Tools - Building and housing codes, sanitary codes and other special regulations can be enacted at the local level to help preserve the flood convenance capacity of flood plains.

Flood plain regulations also help to achieve broader community objectives such as preservation of wildlife, prime farmland, scenic beauty and open space.

Although there are very few residences and other structures presently in the flood plain, the economic impact of flooding could be substantial for these individual owners. Flood insurance can be used to modify this impact. Insurance is a means for spreading the cost of losses over time and over a large number of risks. Under the National Flood Insurance Program, the government subsidizes flood insurance for existing property in return for enactment and enforcement of flood plain management regulations designed to reduce future losses and prevent development in flood prone areas. The emergency program is normally the entry phase for Ohio communities. At this stage, flood insurance is available throughout the entire community at flat rates without regard to the local flood hazards.

The detailed hydrologic and hydraulic calculations contained in this flood hazard analysis can be used by the Federal Emergency Management Agency to conduct a detailed flood rate study. This would allow the community to enter into the regular phase of the program. Insurance rate zones would be established and policy premiums would be based on the actual flood risk for that particular section of the stream.

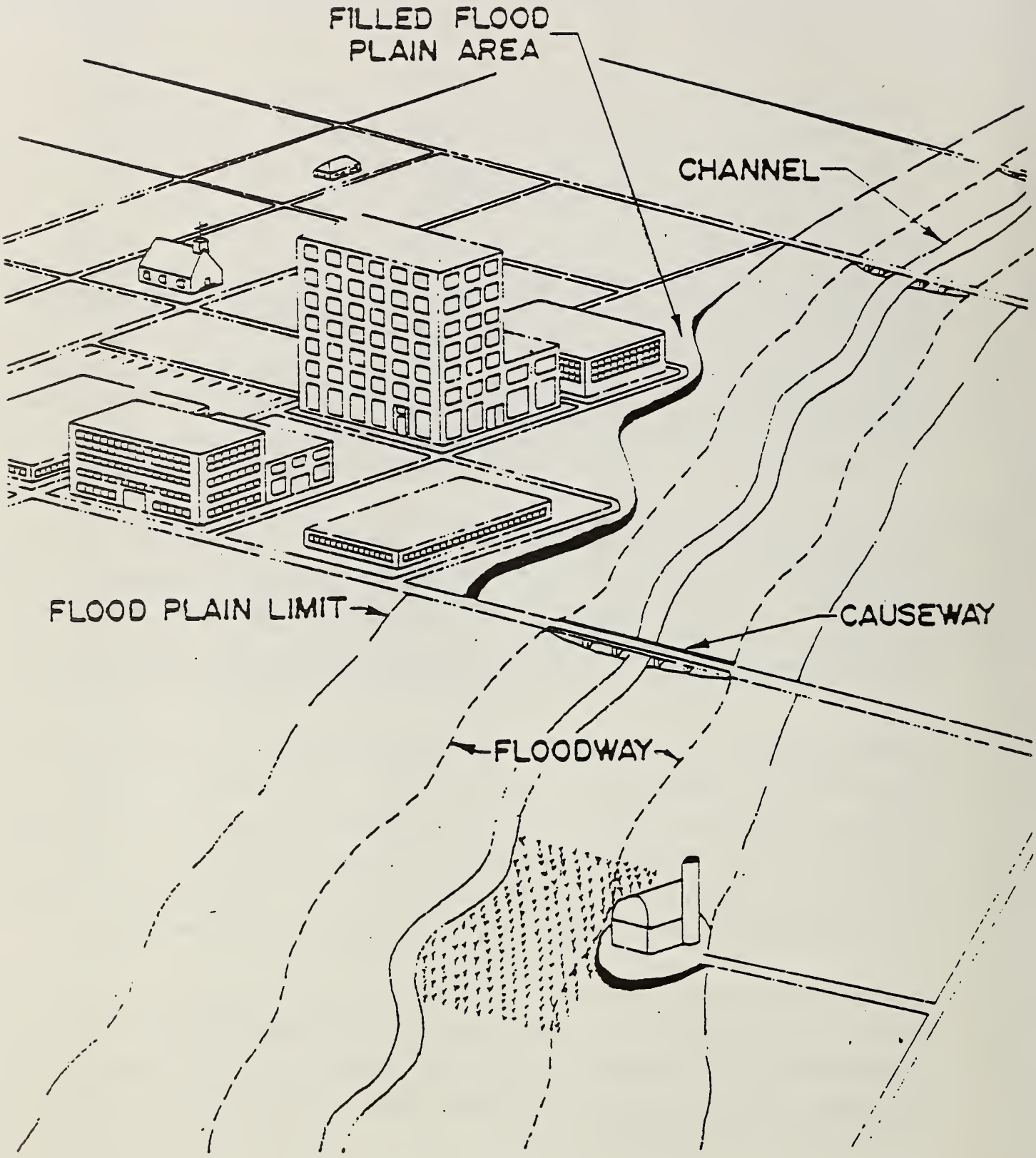
FLOODWAY

The regulatory floodway is not an actual channel, rather it is the equivalent area required to convey the 100-year flood without increasing the water surface heights more than 1.0 foot. The area between the 100-year flood plain boundary and the floodway (flood fringe) may be filled to above the 100-year flood elevation and developed, however, the floodway itself must remain in an open condition. The floodway is delineated on the maps in Appendix A.

Preliminary floodway delineations contained in this report may be used for setting up zoning boundaries and/or regulations controlling land use in the flood plain. The Ohio Department of Natural Resources recommends that if the flood plain is filled, the fill will be at an elevation of 1.5 feet above the 100-year flood elevation. Fill inside the floodway boundary is not permitted.

Another purpose of the floodway is to identify that part of the flood plain where potential damage is the greatest, i.e., the velocity and depth of flooding are greatest. Floodway data are tabulated for each cross section and for the purpose of flood plain management, include distances to the right and left (looking downstream) of the centerline of the stream channel. These distances represent encroachment limits on each side of the flood plain.

Appendix C-4 contains floodway data for each cross section consisting of profile station, width, area, mean velocity, and water surface elevation. Floodway widths were determined by reducing amounts of conveyance equally from both sides of the valley until the water surface was increased one foot above the 100-year flood elevation.



PERSPECTIVE VIEW OF A
FLOOD PLAIN AND FLOODWAY

Figure 2

APPENDIX A

Flood Hazard Area Photomosaics

The following photomosaics are photographs put together to form the desired photographic coverage of the stream reach being studied. These maps include the location of cross sections, known landmarks, benchmarks, and the area bound by the theoretical floodway and the 100-year flood. The determination of the flood boundary lines is based upon existing topographic data. For specific site evaluations, it is recommended that field elevations be compared directly to flood profile elevations in Appendix B.

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FLOOD HAZARD STUDY AREA
MOSAIC SHEET INDEX MAP

WALNUT CREEK

FAIRFIELD COUNTY, OHIO

SOURCE:
1978 GENERAL COUNTY HIGHWAY MAPS AND
INFORMATION FROM S.C.S. FIELD PERSONNEL

USDA-SCS-FORT WORTH, TEXAS 1983

0 1 2 3 4 5 6
SCALE OF MILES

OCTOBER 1982

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FLOOD HAZARD STUDY

WALNUT CREEK

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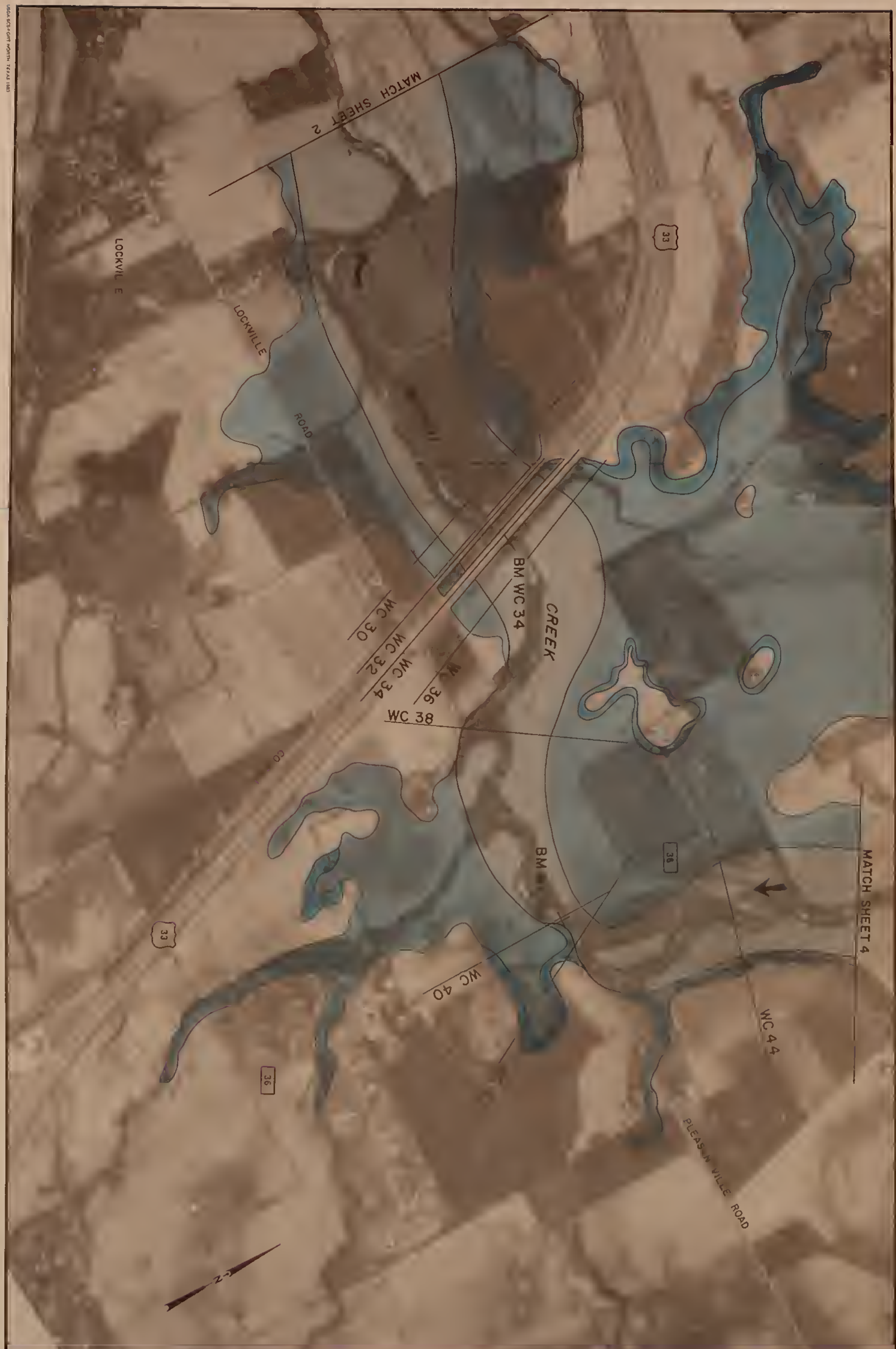
FLOOD HAZARD STUDY

WALNUT CREEK



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FLOOD HAZARD STUDY

WALNUT CREEK

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LEGEND

Floodway Area

100 Year Frequency Flood

500 Year Frequency Flood

BM PC14 Bench Marks

Stream Channel

WC 16 Valley Section Location

800 0 800

Scale in Feet

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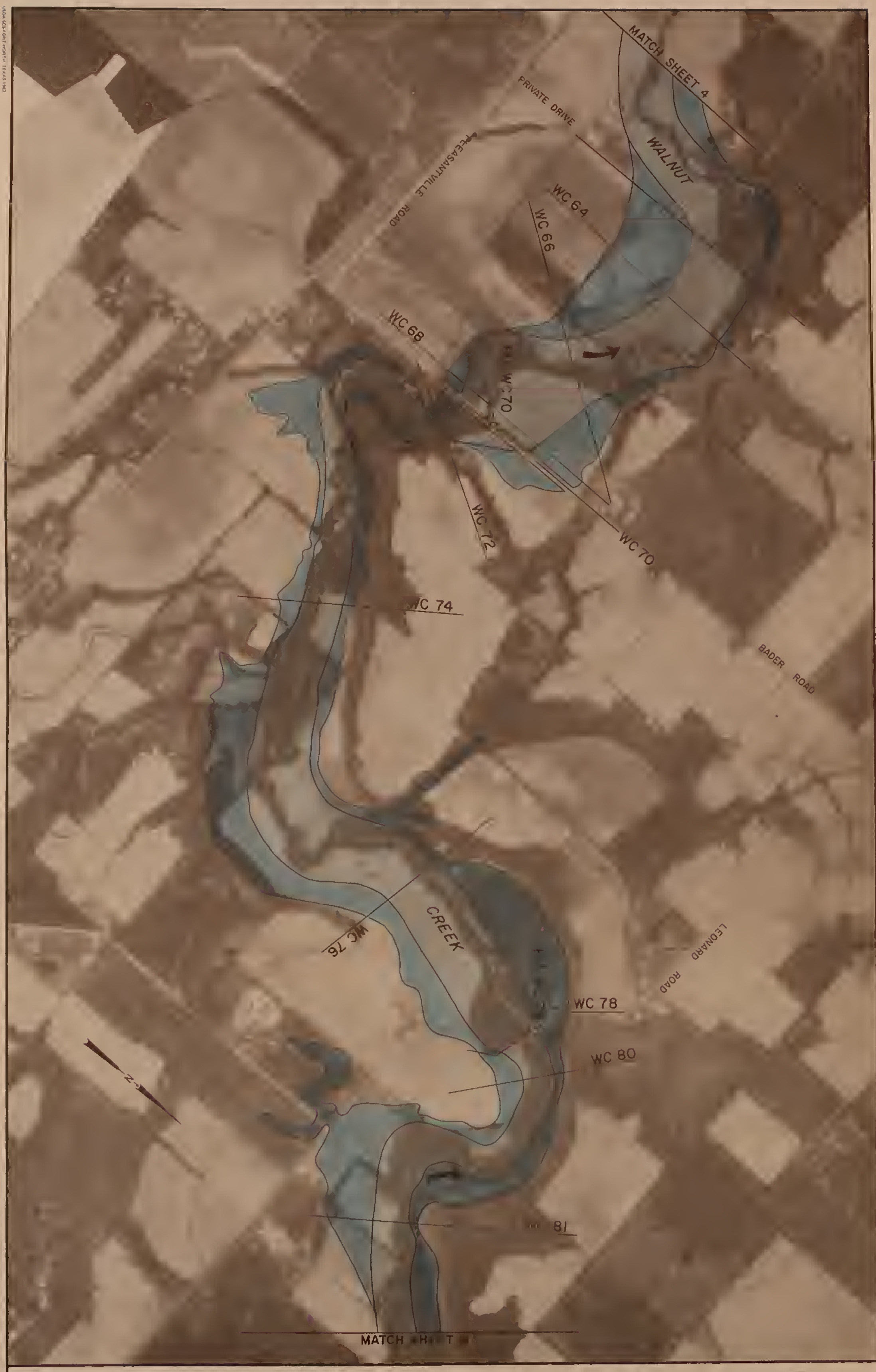
FLOOD HAZARD STUDY

WALNUT CREEK – POPLAR CREEK



Floodway Area

100 Year Frequency Flood

500 Year Frequency Flood

LEGEND

BM PC14 Bench Marks

Stream Channel

WC 16 Valley Section Location

800 0 800

Scale in Feet

ASCS PHOTOGRAPHY 5-80

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WALNUT CREEK
FLOOD HAZARD STUDY
Walnut Creek, Fairfield Co, Ohio

FLOOD HAZARD STUDY

WALNUT CREEK

LEGEND

Floodway Area

100 Year Frequency Flood

500 Year Frequency Flood

BM PC14 Bench Marks

Stream Channel

WC 16 Valley Section Location

800 0 800

Scale in Feet

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FLOOD HAZARD STUDY
Walnut Creek, Fairfield Co, Ohio

FLOOD HAZARD STUDY

POPLAR CREEK

LEGEND

- Floodway Area
- 100 Year Frequency Flood
- 500 Year Frequency Flood
- BM PC14 — Bench Marks
- Stream Channel
- WC 16 — Valley Section Location

800 0 800

Scale in Feet

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Walnut Creek, Fairfield Co, Ohio

FLOOD HAZARD STUDY

POPLAR CREEK

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FLOOD HAZARD STUDY

POPLAR CREEK

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FLOOD HAZARD STUDY

WALNUT CREEK –PAWPAW CREEK

LEGEND

- Floodway Area
- 100 Year Frequency Flood
- 500 Year Frequency Flood
- BM PC14 — Bench Marks
- Stream Channel
- WC 16 — Valley Section Location

800 0 800
Scale in Feet

AERIAL PHOTOGRAPHY 5-80

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FLOOD HAZARD STUDY
Walnut Creek, Fairfield Co, Ohio

FLOOD HAZARD STUDY

PAWPAW CREEK – BALTIMORE TRIBUTARY

APPENDIX B

Flood Profiles

The plotted water surface profiles show the location of cross sections and roads crossing the streams and the elevation of the water surface for the 10, 50, 100, and 500-year floods. The water surface elevation at a particular location can be found by: (1) locating the point in question on the photomosaics (Appendix A); (2) measuring the distance along the stream to the nearest cross section; (3) locating the selected cross section along the profile in this appendix; and (4) measuring the same distance horizontally to the desired point. The water surface elevation can then be read from the vertical scale.

MATCH SHEET 9

WC 100

LEONARD ROAD

WC 102

WC 104

WALNUT

WC 106

BM WC 108

WC 108

WC 110

WC 112

LW 2

LITTLE WALNUT CREEK

WC 114

LW 4

BM LW6

LW 8

LW6

LEITNAKER ROAD

OLD MILLERSPORT ROAD

37

MATCH SHEET 12

MATCH SHEET 13

LEGEND

	Floodway Area	BM PC14	Bench Marks	WC 16	Valley Section Location
	100 Year Frequency Flood		Stream Channel		
	500 Year Frequency Flood				

800 0 800

Scale in Feet

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WALNUT CREEK
FLOOD HAZARD STUDY
Walnut Creek, Fairfield Co, Ohio

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FLOOD HAZARD STUDY

WALNUT CREEK

LEGEND

- Floodway Area
- 100 Year Frequency Flood
- 500 Year Frequency Flood
- BM PC14 — Bench Marks
- Stream Channel
- WC 16 — Valley Section Location

800 0 800
Scale in Feet

SEE PHOTOGRAPH NO. B-30

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FLOOD HAZARD STUDY

WALNUT CREEK

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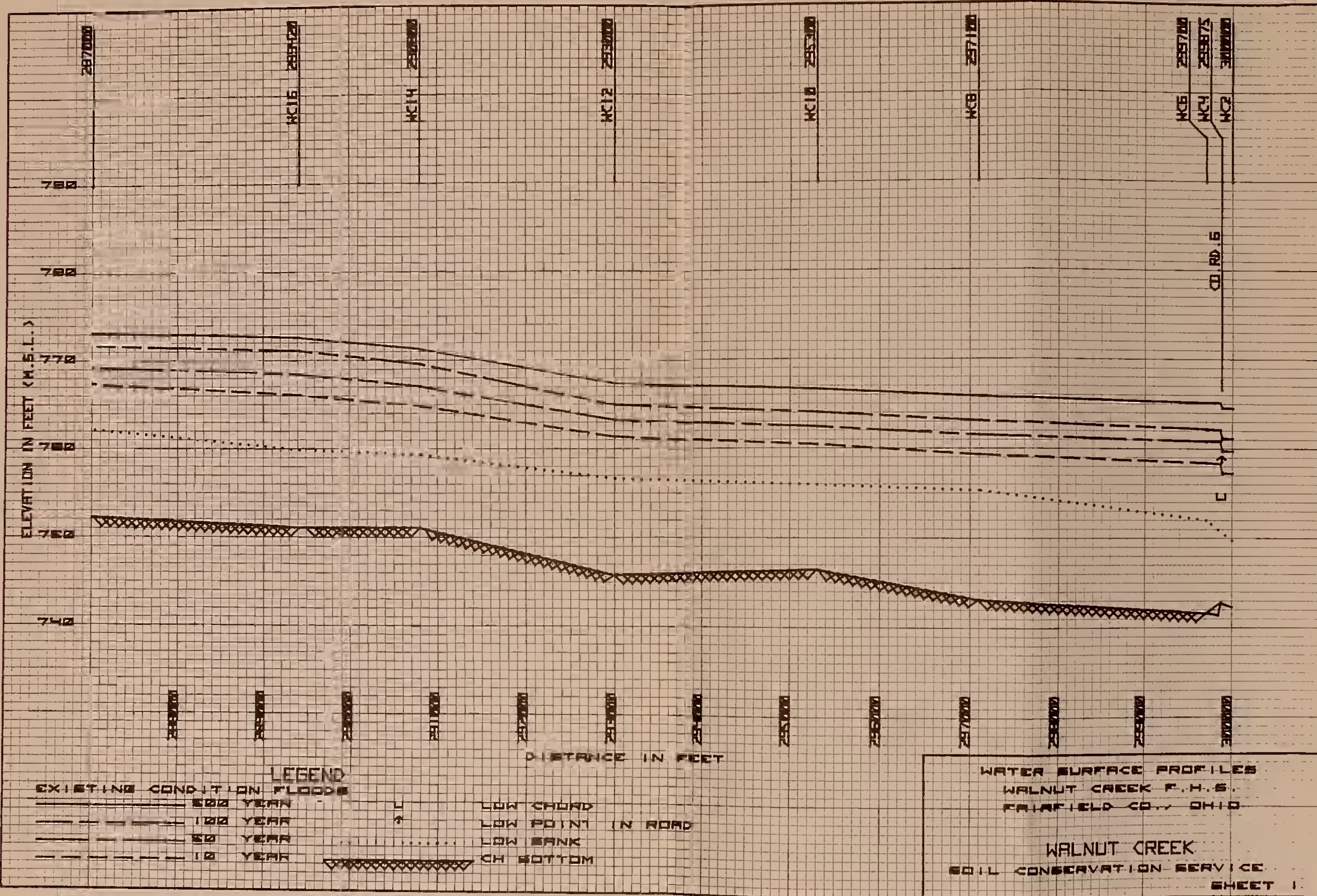
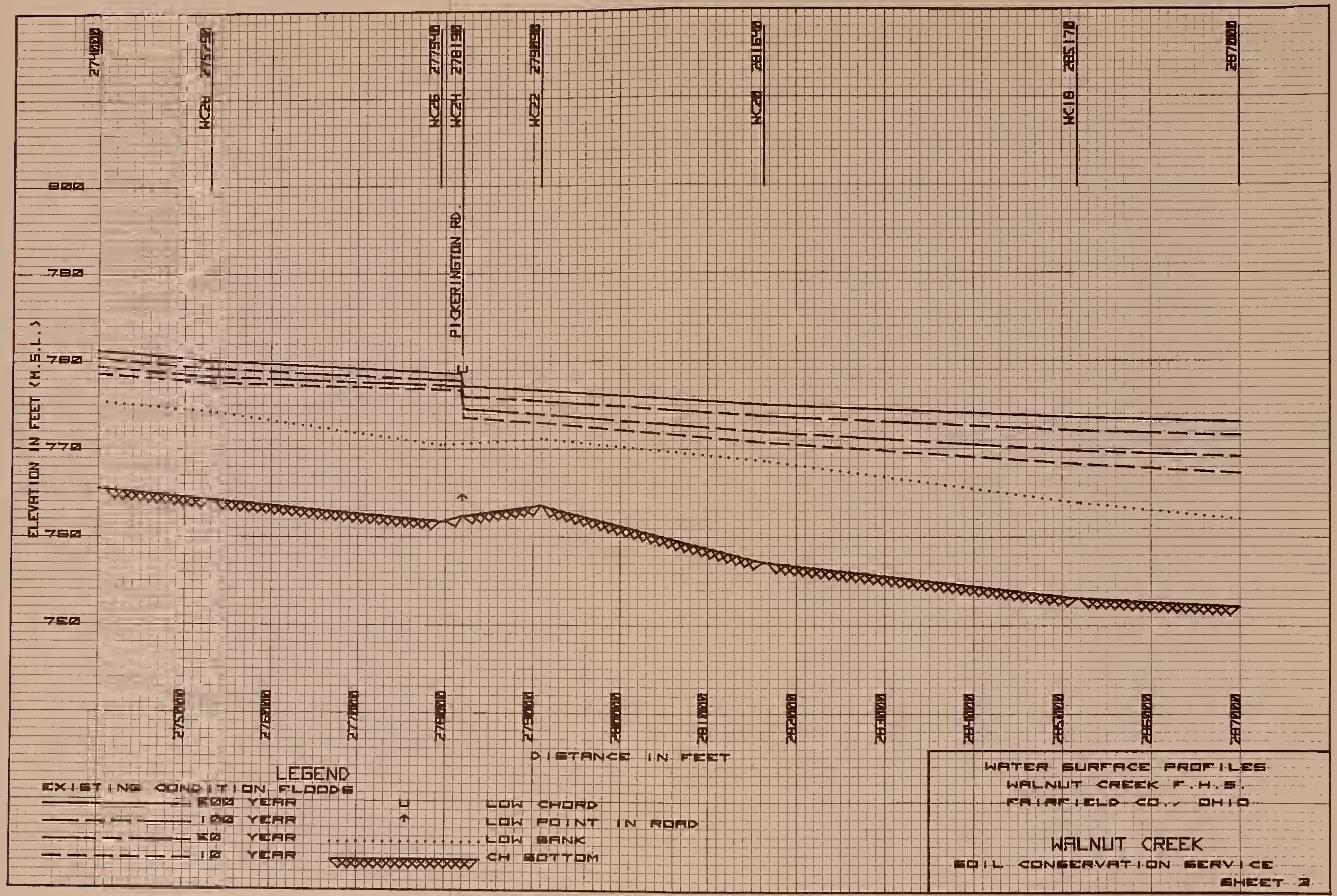
FLOOD HAZARD STUDY
Walnut Creek, Fairfield Co, Ohio

FLOOD HAZARD STUDY

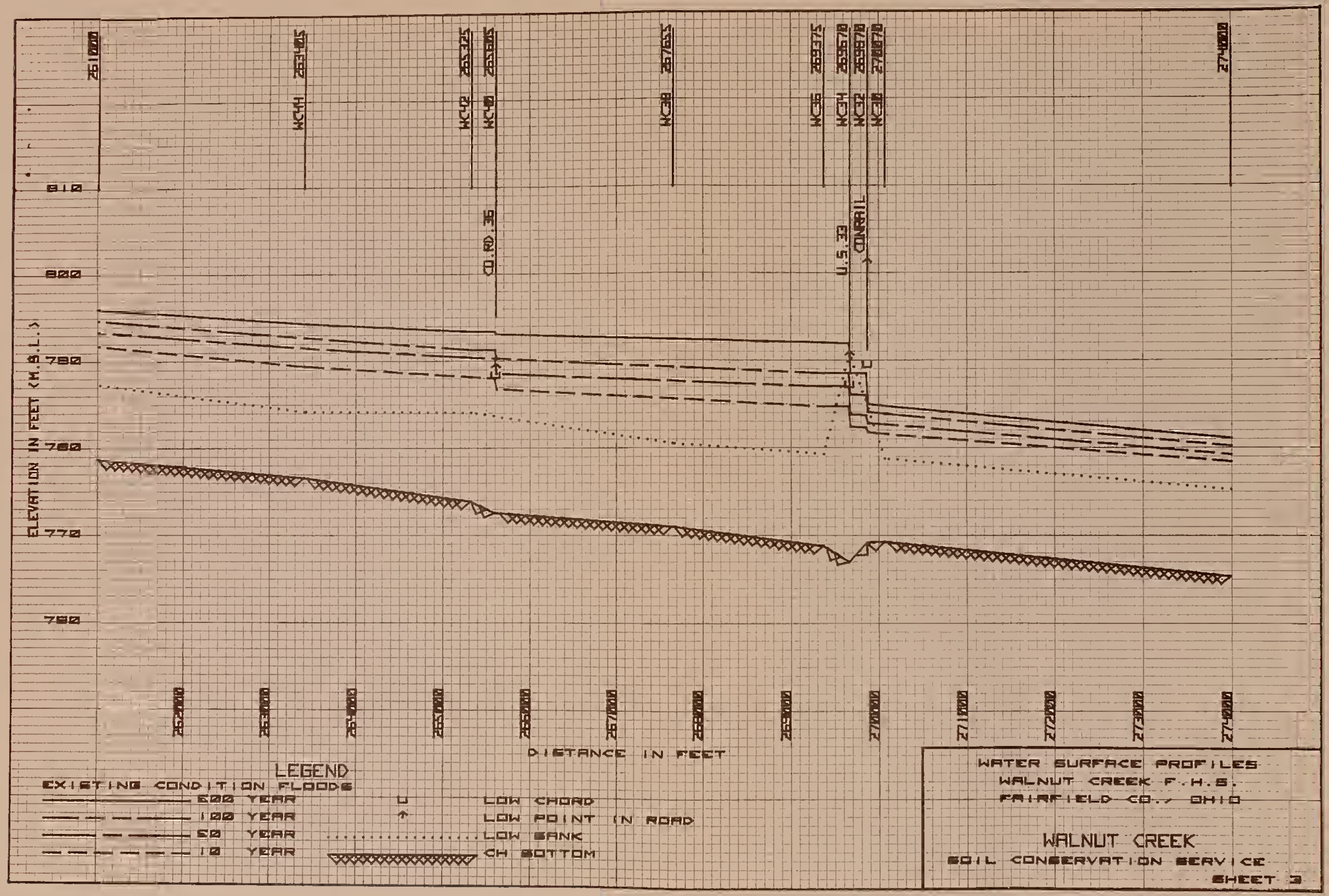
LITTLE WALNUT CREEK

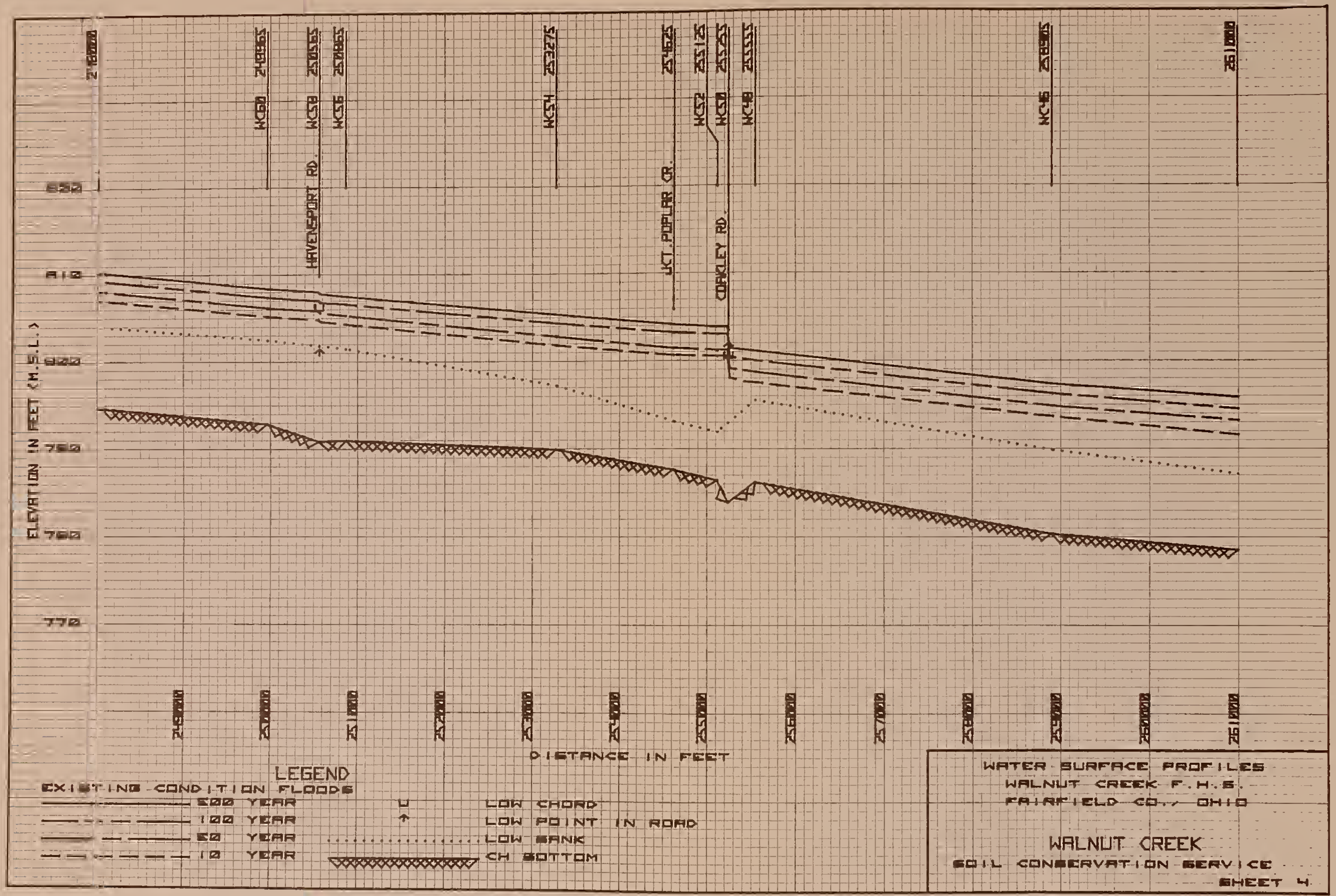

ELEVATION IN FEET (M.S.L.)
790
780
770
760
750
740
287000
WC16 289420
WC14 290800
WC12 293000
WC10 295300
WC8 297100
WC6 299700
WC4 299875
WC2 300000
CO.RD.6
288000
289000
290000
291000
292000
293000
294000
295000
296000
297000
298000
299000
300000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 1

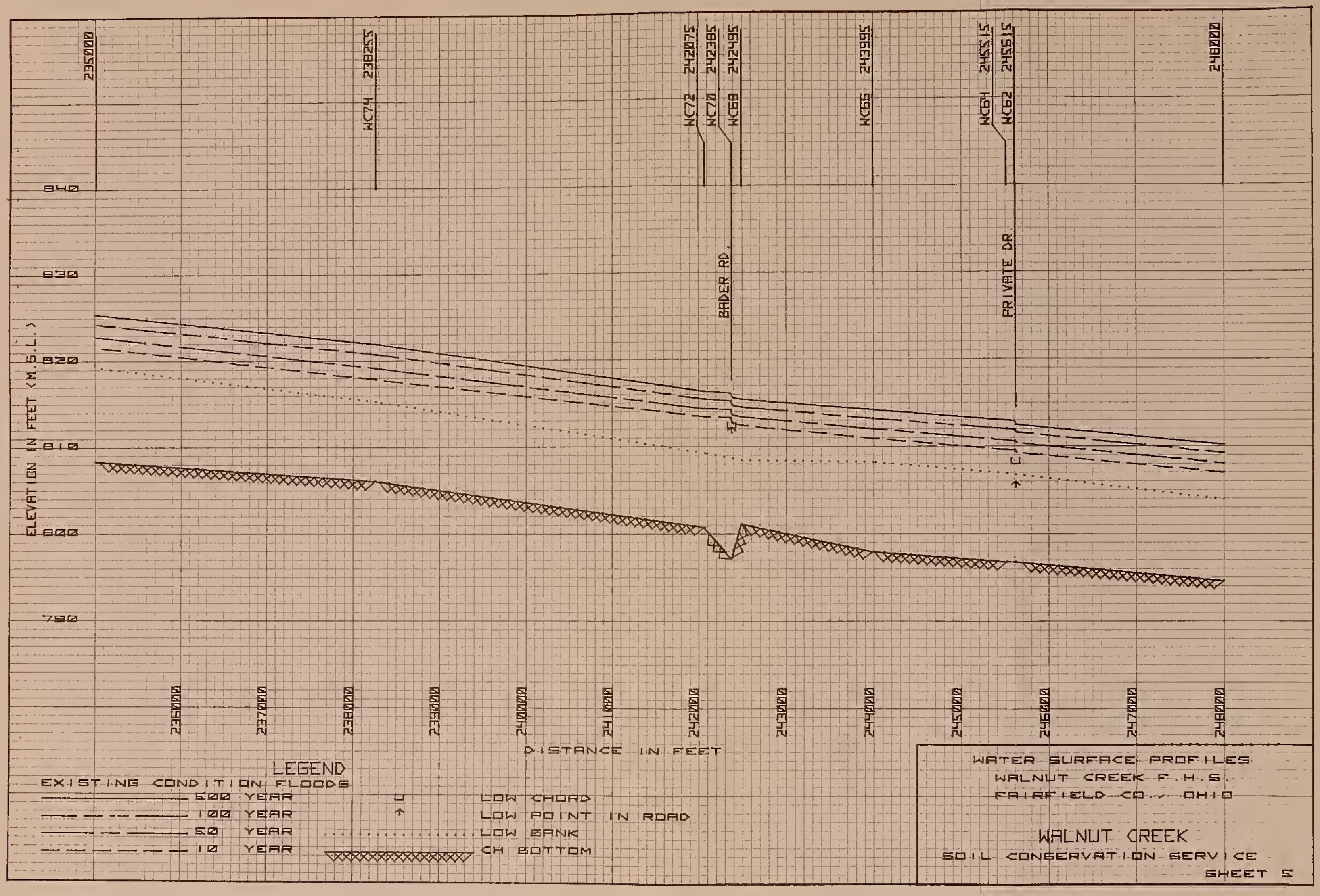


WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO

WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 2


ELEVATION IN FEET (M.S.L.)
810
800
790
780
770
760
WC44 263405
WC42 265325
WC40 265805
CO. RD. 35
WC38 267655
WC36 269375
WC34 269670
WC32 269870
WC30 270870
U.S. 33
CONRAIL
274000
252000
253000
254000
255000
256000
257000
258000
259000
270000
271000
272000
273000
274000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
U LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 3


WC60 240865
WC58 250565
WC56 250865
WC54 253275
WC52 255125
WC50 255255
WC48 255555
WC46 258565
HAVENSPORT RD.
UCT. POPLAR CR.
CORKLEY RD.
ELEVATION IN FEET (M.S.L.)
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 4


ELEVATION IN FEET (M.S.L.)
840
830
820
810
800
790
WC74 238255
WC72 242075
WC70 242385
WC68 242495
WC66 243995
WC64 245515
WC62 245515
BADER RD.
PRIVATE DR.
235000
237000
238000
239000
240000
241000
242000
243000
244000
245000
246000
247000
248000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 5

ELEVATION IN FEET (M.S.L.)

820

840

860

800

WC81 222525

WC81 228875

WC80 231565

WC78 231975

WC76 233975

LEONARD RD.

222000

235000

22300 22400 22500 22600 22700 22800 22900 23000 23100 23200 23300 23400 23500

DISTANCE IN FEET

LEGEND

EXISTING CONDITION FLOODS

500 YEAR

100 YEAR

50 YEAR

10 YEAR

LOW CHORD

LOW POINT IN ROAD

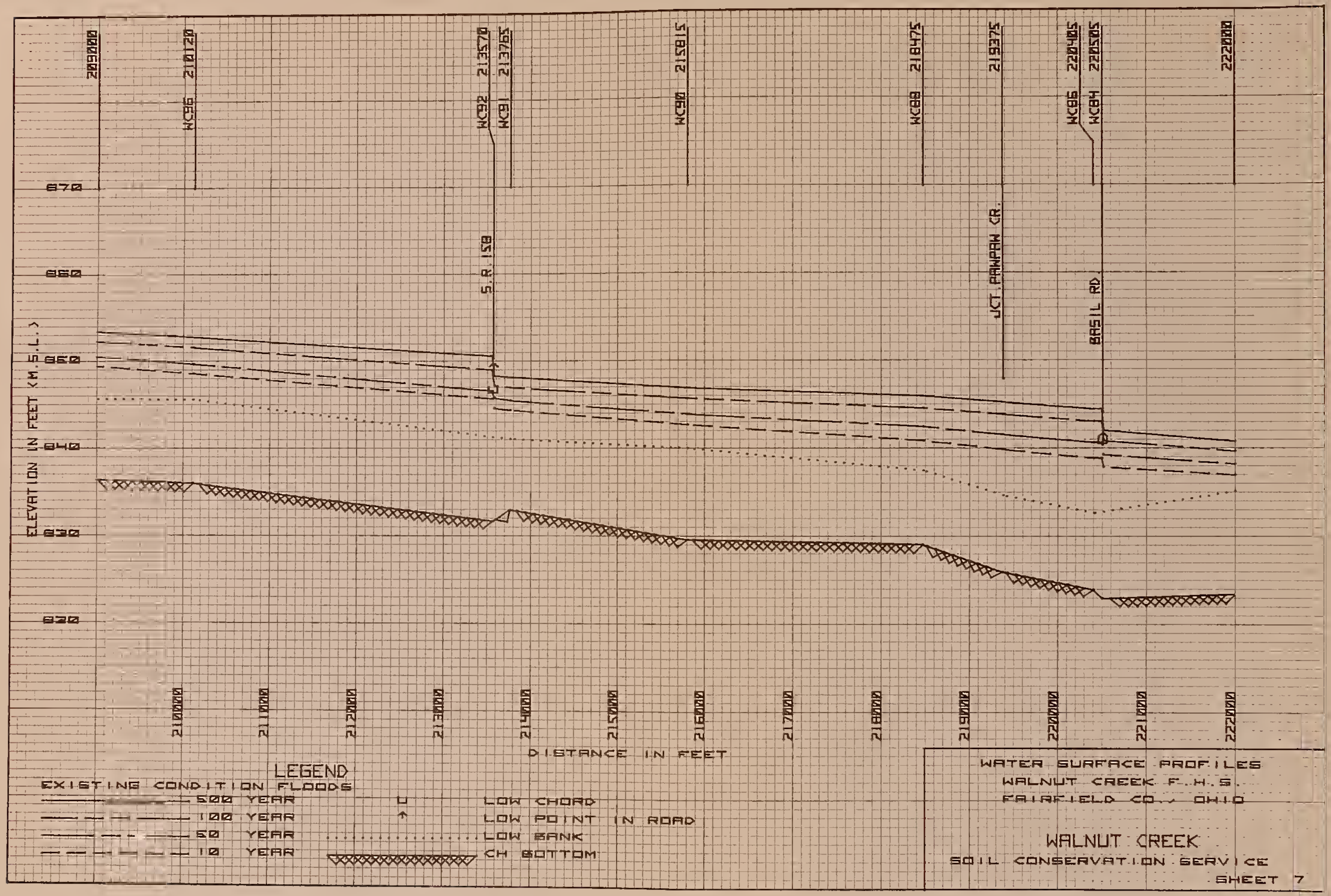
LOW BANK

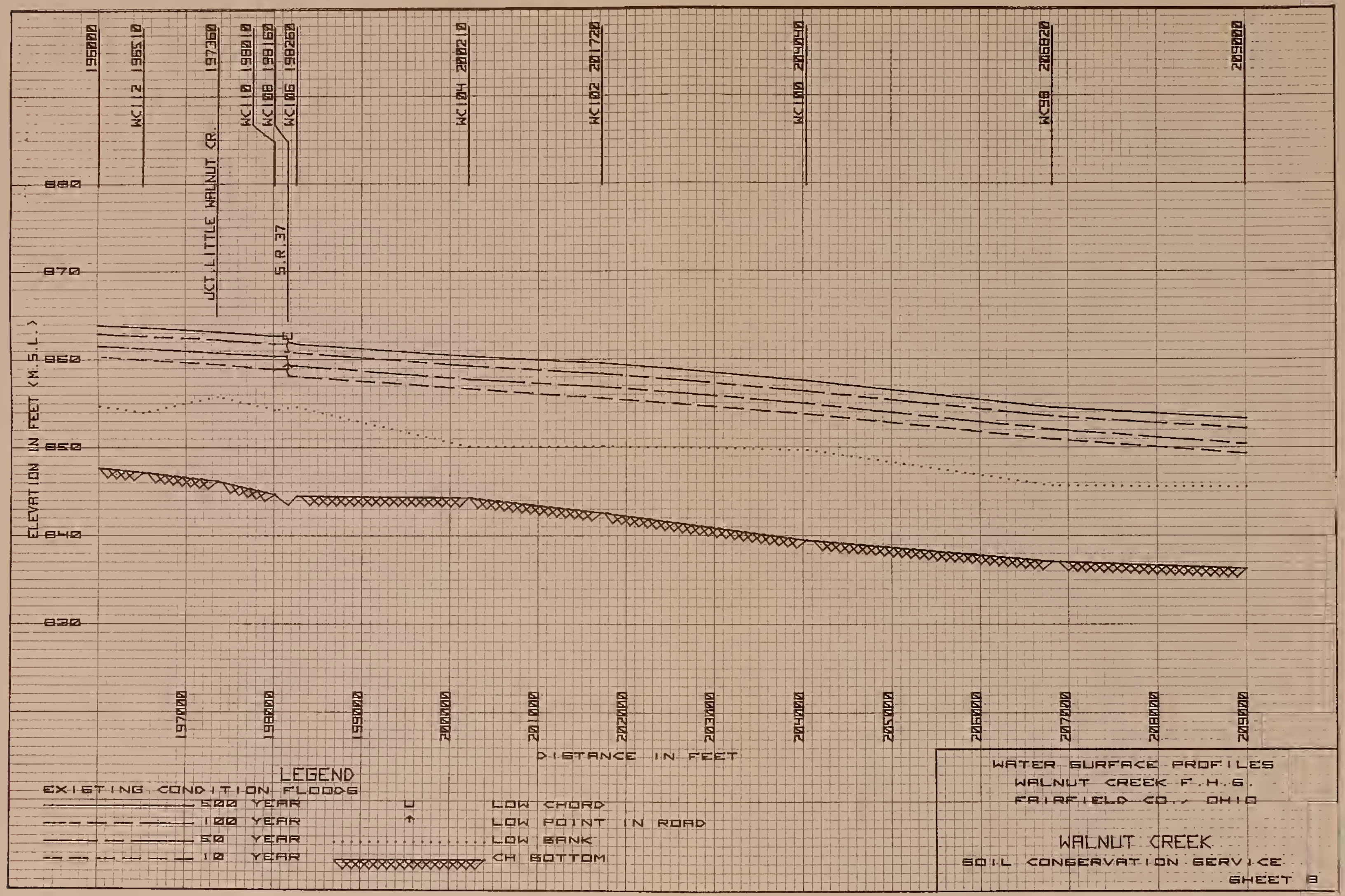
CH BOTTOM

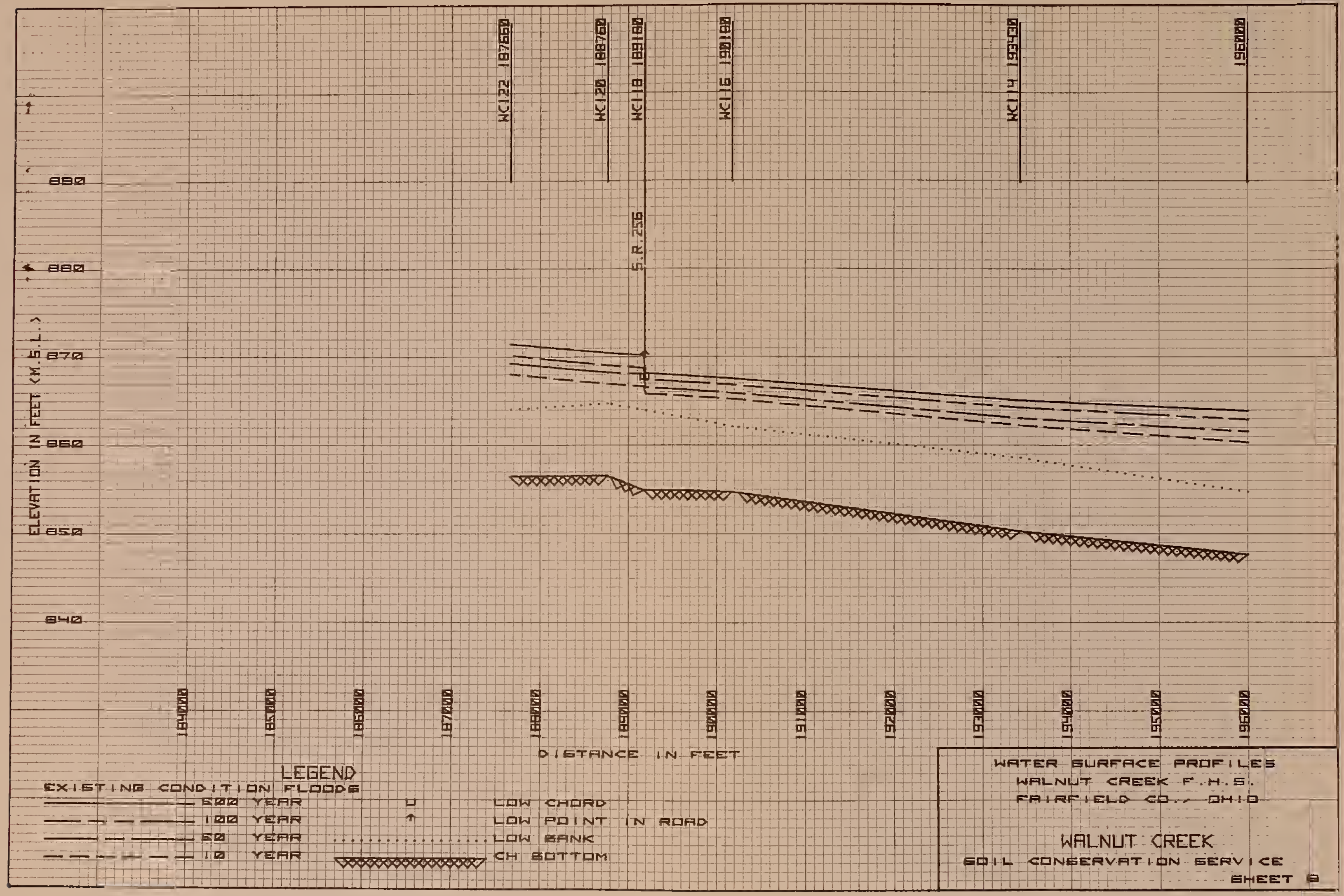
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO

WALNUT CREEK
SOIL CONSERVATION SERVICE

SHEET 6


ELEVATION IN FEET (M.S.L.)
870
860
850
840
830
820
WC96 210120
WC92 213570
WC91 213765
S.R. 158
WC90 215815
WC88 218475
JCT. PAWPAW CR.
219375
WC86 220405
WC84 220570
BASIL RD.
222000
210000
211000
212000
213000
214000
215000
216000
217000
218000
219000
220000
221000
222000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 7

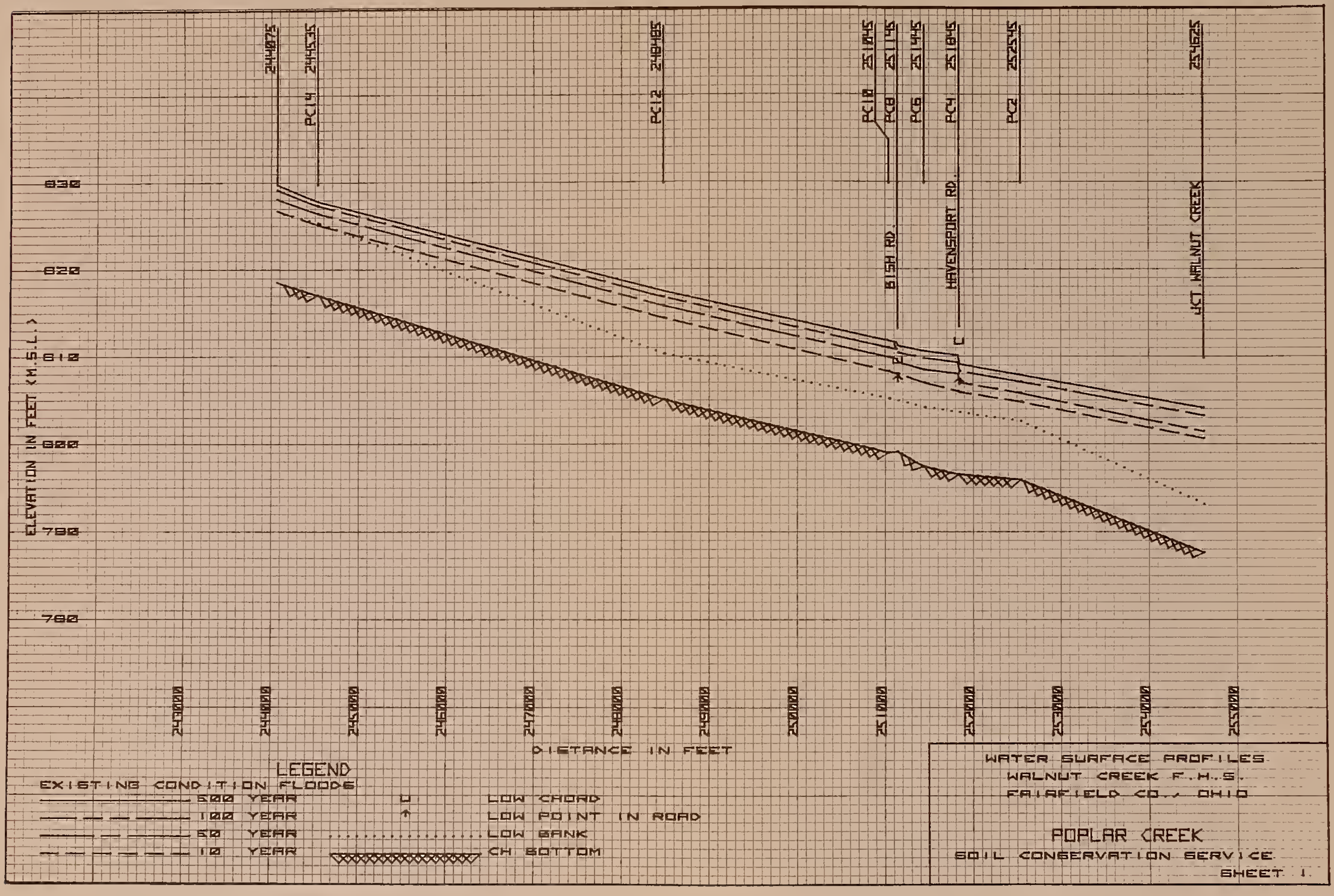

ELEVATION IN FEET (M.S.L.)
850
840
830
870
860
195000
WC112 195510
UCT.LITTLE WALNUT CR. 197360
WC110 198010
WC108 198160
WC106 198260
S.R.37
WC104 200210
WC102 201720
WC100 204040
WC98 206820
209000
197000
198000
199000
200000
201000
202000
203000
204000
205000
206000
207000
208000
209000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
WALNUT CREEK
SOIL CONSERVATION SERVICE
SHEET 3

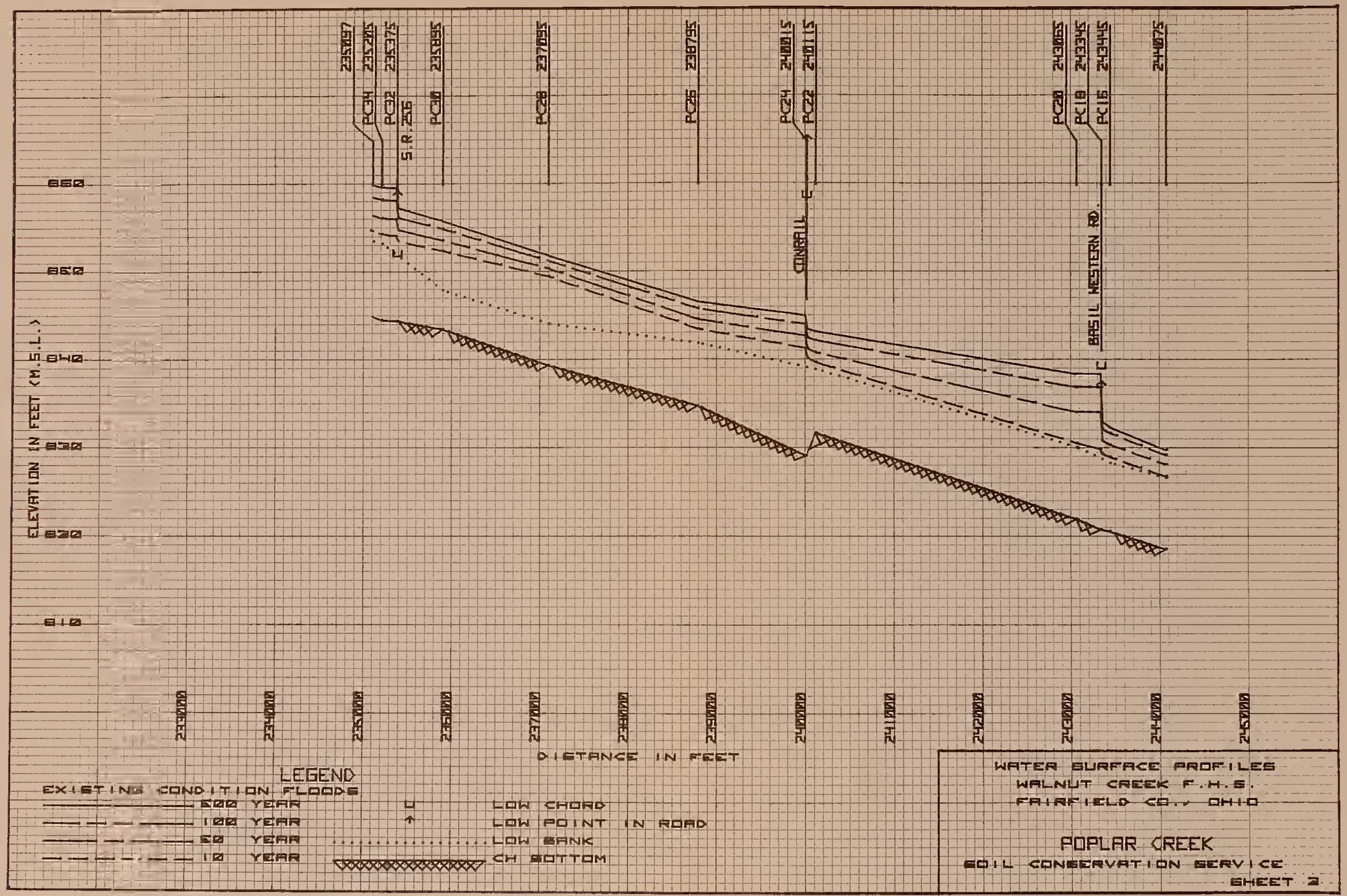


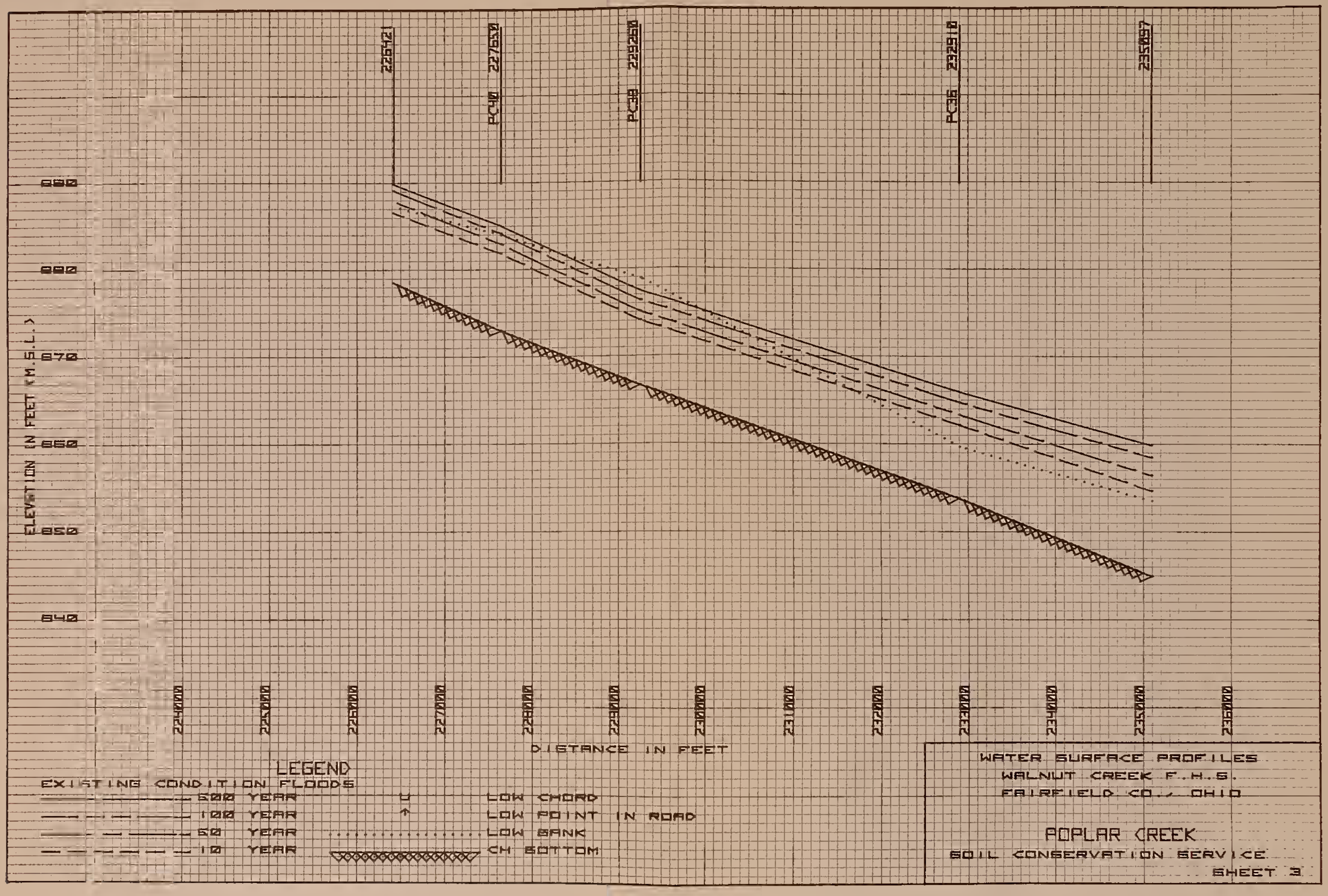
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO

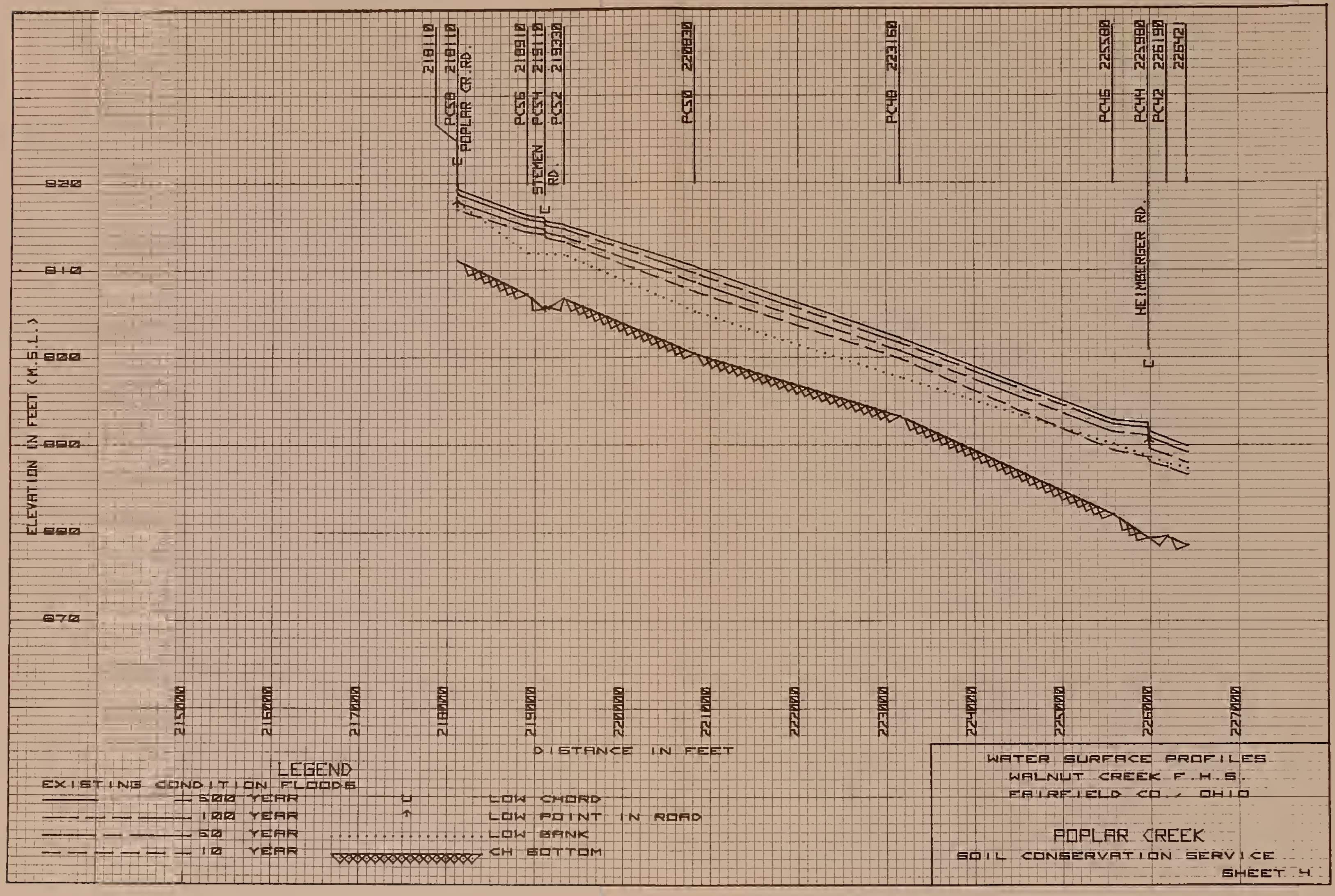
WALNUT CREEK
SOIL CONSERVATION SERVICE

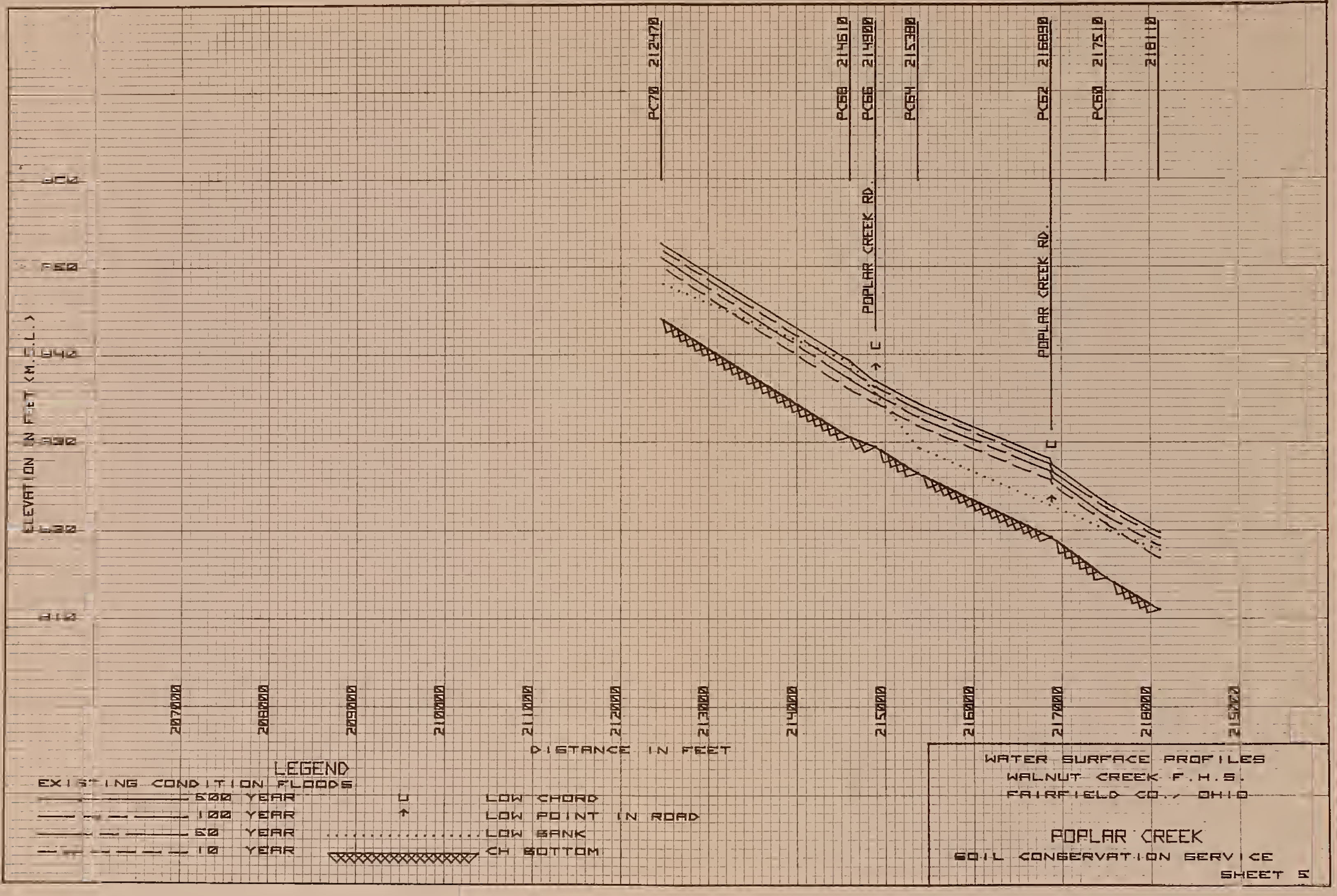
SHEET 8

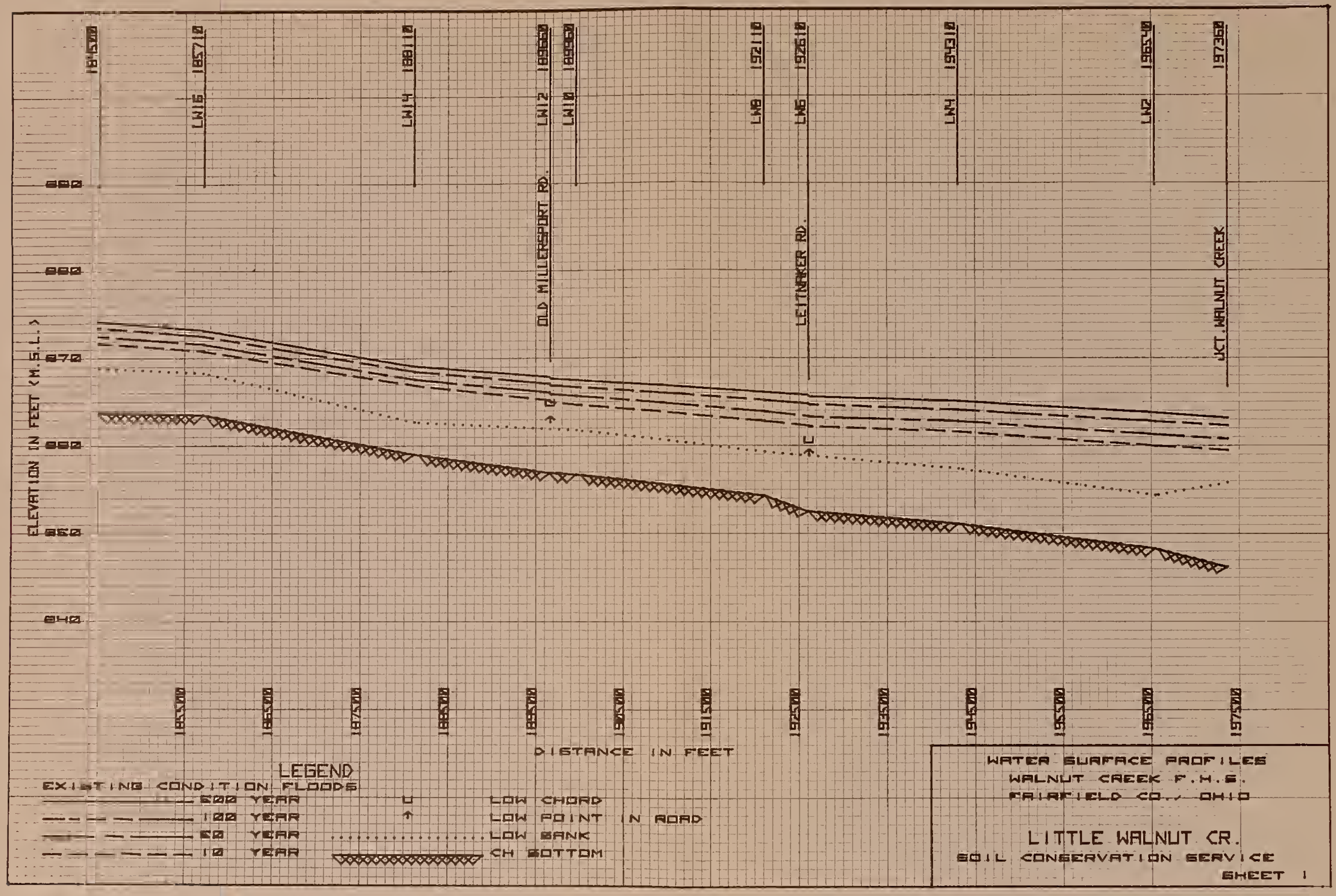

ELEVATION IN FEET (M.S.L.)
800
820
840
DISTANCE IN FEET
240000
241000
242000
243000
244000
245000
246000
247000
248000
249000
250000
251000
252000
253000
254000
255000
244075
PC14 244535
PC12 248485
PC10 251045
PC8 251145
PC6 251445
PC4 251845
PC2 252545
254625
BISH RD.
HAVENSPORT RD.
WALNUT CREEK
P
C
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
POPLAR CREEK
SOIL CONSERVATION SERVICE
SHEET 1

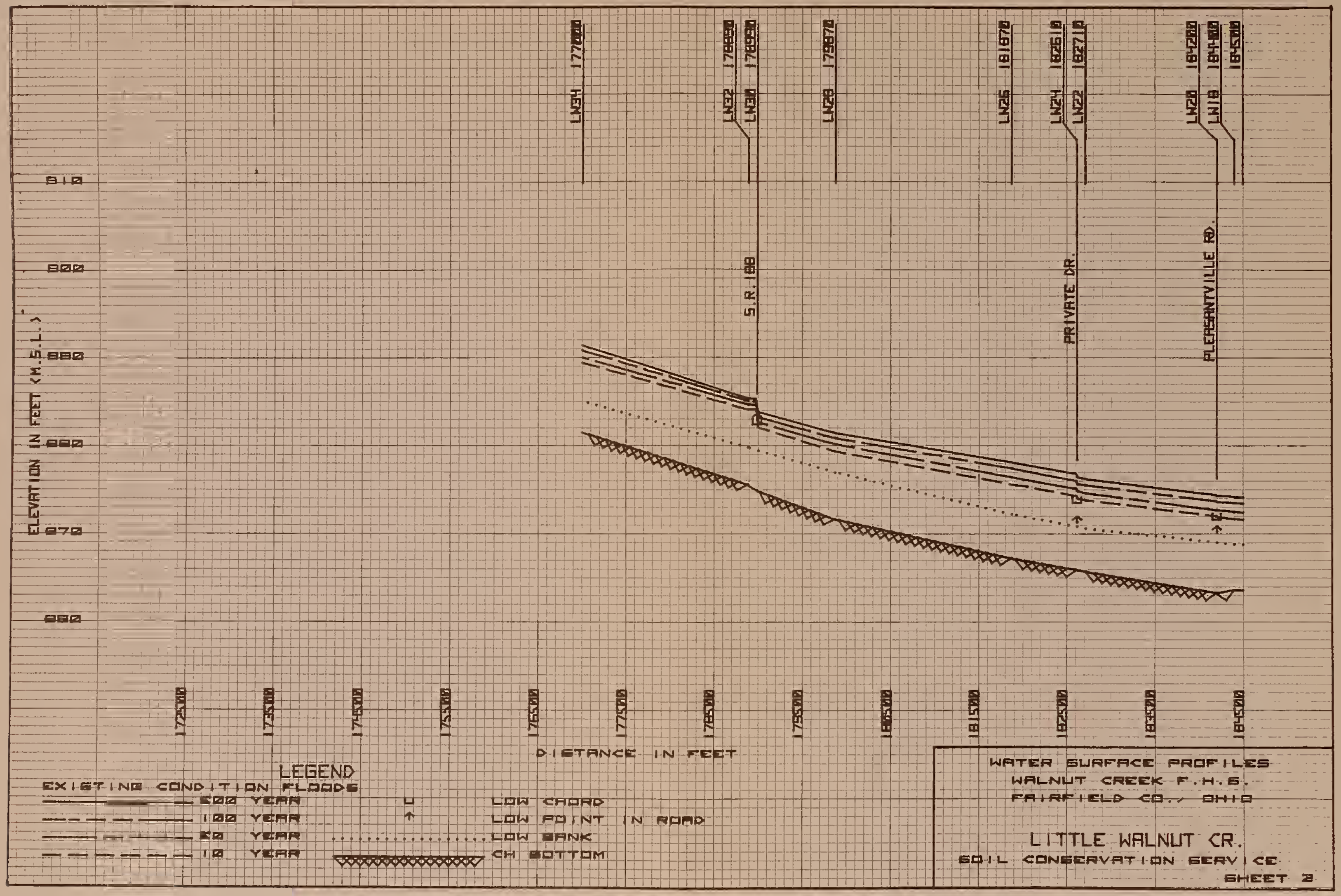

ELEVATION IN FEET (M.S.L.)
830
840
850
860
810
820
233000
234000
235000
236000
237000
238000
239000
240000
241000
242000
243000
244000
245000
DISTANCE IN FEET
235097
PC34 235205
PC32 235375
S.R. 226
PC30 235895
PC28 237055
PC26 238795
PC24 240015
PC22 240115
CONRAIL
PC20 243065
PC18 243345
PC16 243445
BASIL WESTERN RD.
244875
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
POPLAR CREEK
SOIL CONSERVATION SERVICE
SHEET 2


ELEVATION IN FEET (M.S.L.)
880
870
860
850
840
226421
PC40 227650
PC38 229250
PC36 232810
235057
224000
225000
226000
227000
228000
229000
230000
231000
232000
233000
234000
235000
236000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
POPLAR CREEK
SOIL CONSERVATION SERVICE
SHEET 3


ELEVATION IN FEET (M.S.L.)
870
880
890
900
910
920
215000
216000
217000
218000
219000
220000
221000
222000
223000
224000
225000
226000
227000
DISTANCE IN FEET
219110
PCS8 218110
POPLAR CR. RD.
PCS6 218910
PCS4 218110
STEMEN RD.
PCS2 219330
PCS0 220830
PC48 223160
PC46 225580
PC44 225980
PC42 226190
226421
HEIMBERGER RD.
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
POPLAR CREEK
SOIL CONSERVATION SERVICE
SHEET 4


ELEVATION IN FEET (M.S.L.)
930
890
850
810
PC70 212470
PC68 214610
PC66 214900
PC64 215390
PC62 216890
PC60 217510
218110
POPLAR CREEK RD.
POPLAR CREEK RD.
207000
208000
209000
210000
211000
212000
213000
214000
215000
216000
217000
218000
219000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
POPLAR CREEK
SOIL CONSERVATION SERVICE
SHEET 5


ELEVATION IN FEET (M.S.L.)
880
870
860
840
LW16 185710
LW14 188110
OLD MILLERSPORT RD.
LW12 189550
LW10 189550
LW8 192110
LEITNAKER RD.
LW6 192610
LW4 194310
LW2 196540
UCT. WALNUT CREEK 197360
185000
186000
187000
188000
189000
190000
191000
192000
193000
194000
195000
196000
197000
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
LITTLE WALNUT CR.
SOIL CONSERVATION SERVICE
SHEET 1

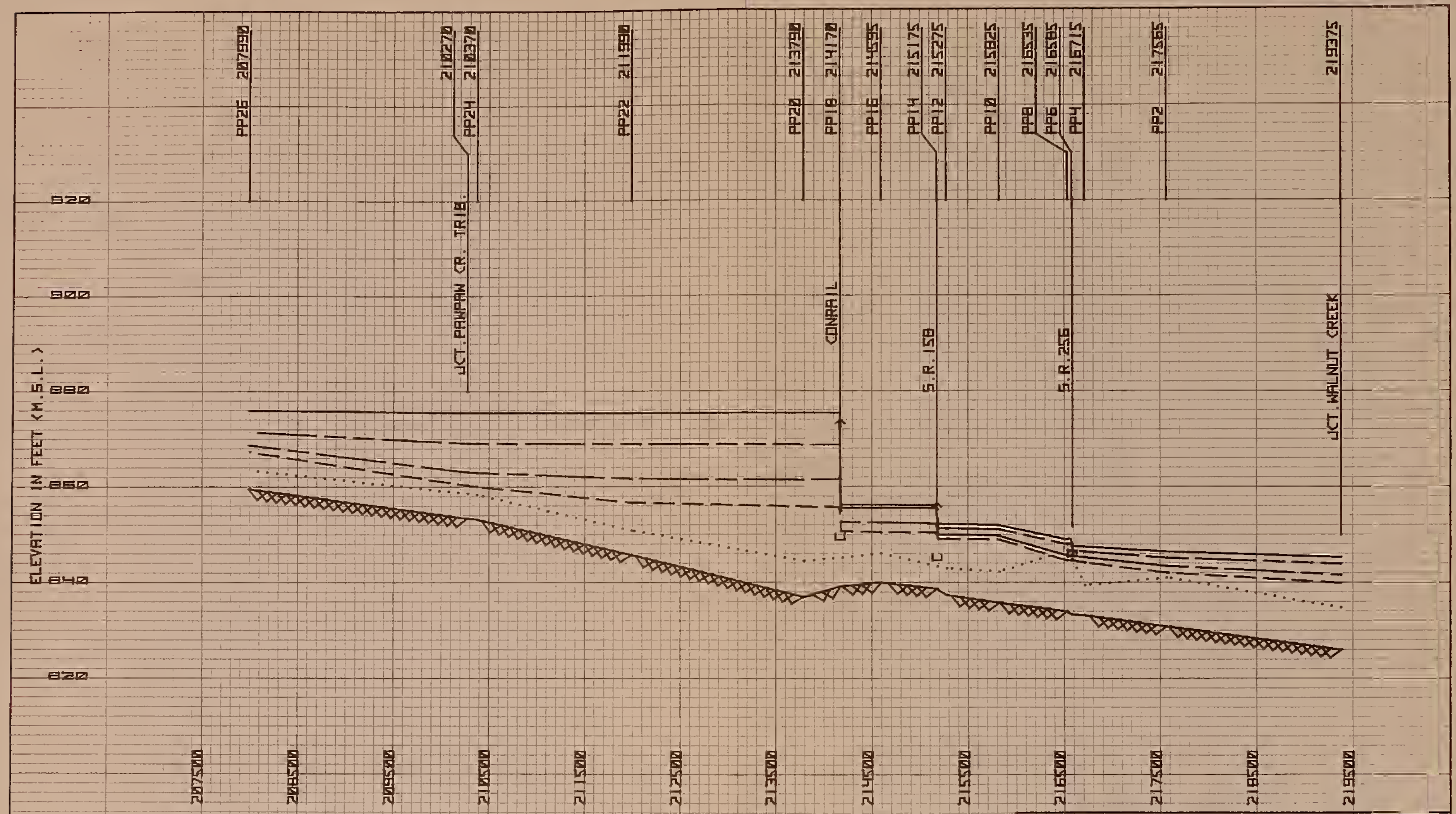


WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO

LITTLE WALNUT CR.

SOIL CONSERVATION SERVICE

SHEET 2

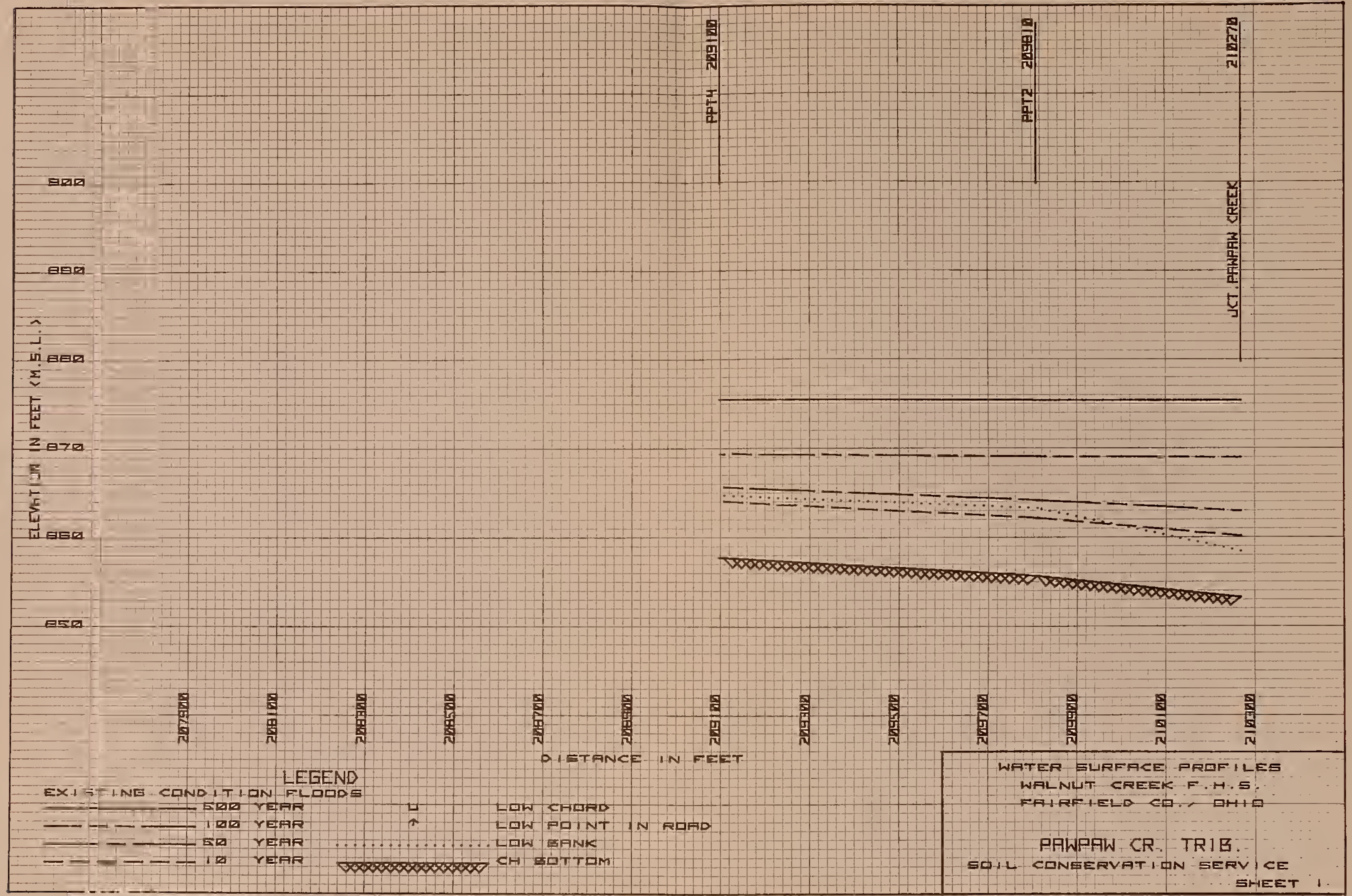


WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO

PAWPAW CREEK

SOIL CONSERVATION SERVICE

SHEET 1

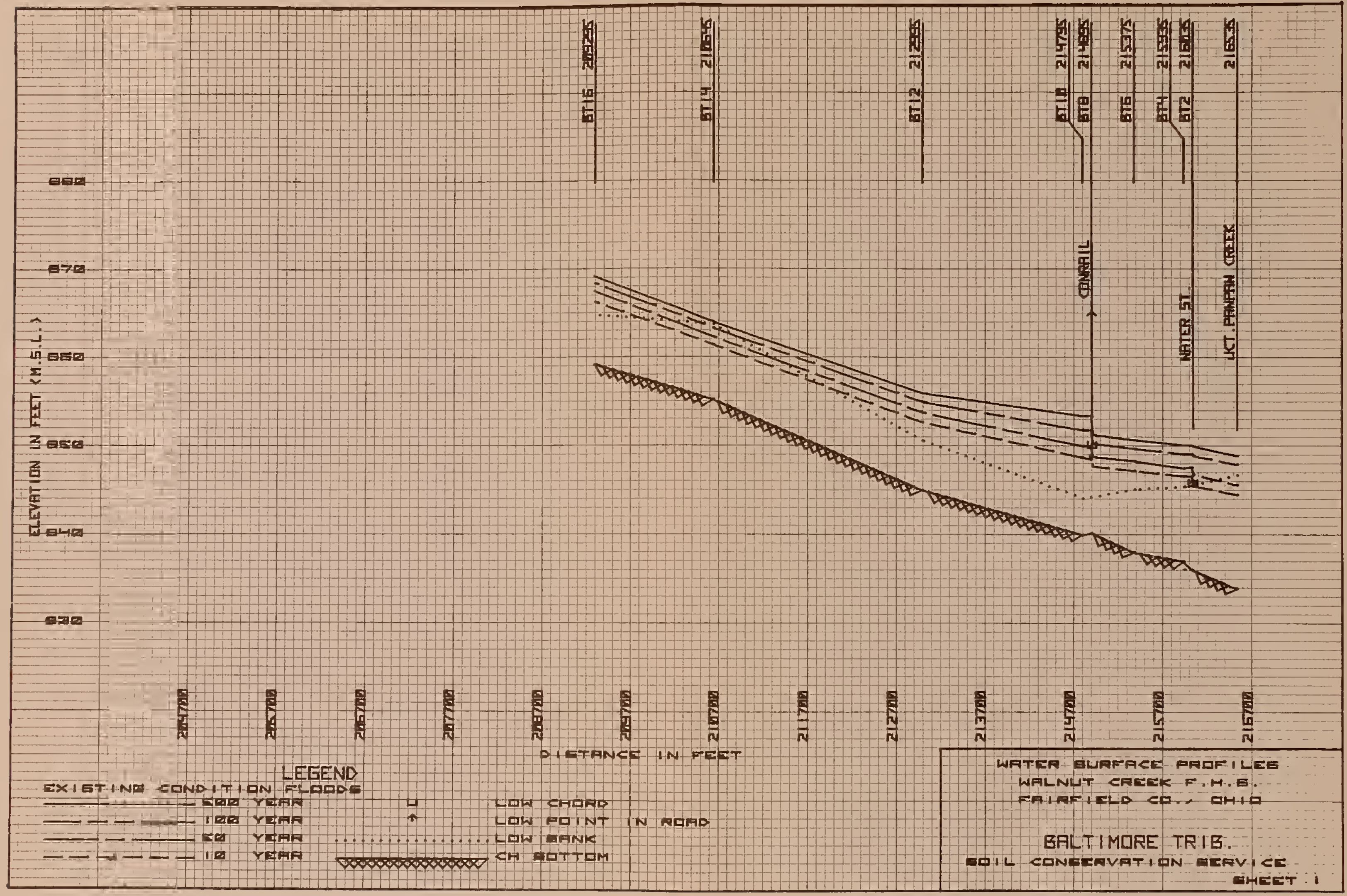


WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO

PAWPAW CR. TR18.

SOIL CONSERVATION SERVICE

SHEET 1


ELEVATION IN FEET (M.S.L.)
890
870
850
840
830
BT16 20925
BT14 21065
BT12 21295
BT10 21475
BT8 21485
BT6 21537
BT4 21535
BT2 21805
CONRAIL
WATER ST.
LKT. PANFAN CREEK 21655
204700
205700
206700
207700
208700
209700
210700
211700
212700
213700
214700
215700
DISTANCE IN FEET
LEGEND
EXISTING CONDITION FLOODS
500 YEAR
100 YEAR
50 YEAR
10 YEAR
LOW CHORD
LOW POINT IN ROAD
LOW BANK
CH BOTTOM
WATER SURFACE PROFILES
WALNUT CREEK F.H.S.
FAIRFIELD CO., OHIO
BALTIMORE TRIB.
SOIL CONSERVATION SERVICE
SHEET 1

APPENDIX C

Water Surface Elevation and Floodway Data

Appendix C-1 provides a summary of cross section location and stationing. The elevations of the 10, 50, 100, and 500-year floods can be read directly from appendices C-2 and C-3 for the desired cross section. Appendix C-2 is for valley sections while Appendix C-3 is for bridge sections. Appendix C-3 also contains detailed information pertinent to the hydraulic design of bridges. The calculated water surface profiles do not include the effects of ice and/or debris plugged bridges. Appendix C-4 contains floodway data consisting of station, width, area, mean velocity, and water surface elevation for each cross section.

Table C-1: Cross Section Locations

Road & Valley Section	Profile Station	Location
WALNUT CREEK		
WC2	3000+00	Study Limit
WC4	2998+75	CO. RD. 6
WC6	2997+00	
WC8	2971+00	
WC10	2953+00	
WC12	2930+00	
WC14	2908+00	
WC16	2894+20	
WC18	2851+70	
WC20	2816+40	
WC22	2790+90	
WC24	2781+90	Pickerington Rd.
WC26	2779+40	
WC28	2752+90	
WC30	2700+70	
WC32	2698+70	Conrail
WC34	2696+70	U.S. 33
WC36	2693+75	
WC38	2676+55	
WC40	2656+05	CO. RD. 36
WC42	2653+25	
WC44	2634+05	
WC46	2589+05	
WC48	2555+55	
WC50	2552+55	Coakley Rd.
WC52	2551+25	
WC54	2532+75	
WC56	2508+65	

Road & Valley Section	Profile Station	Location
WALNUT CREEK		
WC58	2505+65	Havensport Rd.
WC60	2499+65	
WC62	2456+15	Private Dr.
WC64	2455+15	
WC66	2439+95	
WC68	2424+95	
WC70	2423+85	Bader Rd.
WC72	2420+75	
WC74	2382+55	
WC76	2339+75	
WC78	2319+75	Leonard Rd.
WC80	2315+65	
WC81	2286+75	
WC82	2225+25	
WC84	2205+05	Basil Rd.
WC86	2204+05	
WC88	2184+75	
WC90	2158+15	
WC91	2137+65	
WC92	2135+70	S.R. 158
WC96	2101+20	
WC98	2068+20	
WC100	2040+40	
WC102	2017+20	
WC104	2002+10	
WC106	1982+60	
WC108	1981+60	S.R. 37
WC110	1980+10	

Road & Valley Section	Profile Station	Location
WALNUT CREEK		
WC112	1965+10	
WC114	1934+30	
WC116	1901+80	
WC118	1891+80	S.R. 256
WC120	1887+60	
WC122	1876+60	Study Limit
POPLAR CREEK		
PC2	2525+45	
PC4	2518+45	Havensport Rd.
PC6	2514+45	
PC8	2511+45	Bish Rd.
PC10	2510+45	
PC12	2484+85	
PC14	2445+35	
PC16	2434+45	
PC18	2433+45	Basil Western Rd.
PC20	2430+65	
PC22	2401+15	
PC24	2400+15	Conrail
PC26	2387+95	
PC28	2370+95	
PC30	2358+95	
PC32	2353+75	S.R. 256
PC34	2352+05	
PC36	2329+10	
PC38	2292+60	
PC40	2276+50	

Road & Valley Section	Profile Station	Location
WALNUT CREEK		
PC42	2261+90	
PC44	2259+80	Heimberger Rd.
PC46	2255+80	
PC48	2231+60	
PC50	2208+30	
PC52	2193+30	
PC54	2191+10	Stemen Rd.
PC56	2189+10	
PC58	2181+10	Poplar Creek Rd.
PC60	2175+10	
PC62	2168+90	Poplar Creek Rd.
PC64	2153+80	
PC66	2149+00	Poplar Creek Rd.
PC68	2146+10	
PC70	2124+70	Study Limit
LITTLE WALNUT CREEK		
LW2	1965+40	
LW4	1943+10	
LW6	1926+10	Leitnaker Rd.
LW8	1921+10	
LW10	1899+60	
LW12	1896+60	Old Millersport Rd.
LW14	1881+10	
LW16	1857+10	
LW18	1844+00	
LW20	1842+00	Pleasantville Rd.

Road & Valley Section	Profile Station	Location
LITTLE WALNUT CREEK		
LW22	1827+10	
LW24	1826+10	Private Dr.
LW26	1818+70	
LW28	1798+70	
LW30	1789+90	S.R. 188
LW32	1788+90	
LW34	1770+00	Study Limit
PAWPAW CREEK		
PP2	2175+65	
PP4	2167+15	
PP6	2165+85	S.R. 256
PP8	2165+35	
PP10	2158+25	
PP12	2152+75	
PP14	2151+75	S.R. 158
PP16	2145+95	
PP18	2141+70	Conrail
PP20	2137+90	
PP22	2119+90	
PP24	2103+70	
PP26	2079+90	Study Limit
PAWPAW CREEK TRIBUTARY		
PPT2	2098+10	
PPT4	2091+00	Study Limit

Road & Valley Section	Profile Station	Location
BALTIMORE TRIBUTARY		
BT2	2160+35	Water St.
BT4	2159+35	
BT6	2153+75	
BT8	2148+95	Conrail
BT10	2147+95	
BT12	2129+95	
BT14	2106+45	
BT16	2092+95	Study Limit

Appendix C-2: Water Surface Elevation and Discharge

Cross Section	Station (FT)	Peak Discharge (CFS) Flood Frequency				Water Surface Elevation (Feet MSL) Flood Frequency			
		10-Year	50-Year	100-Year	500-Year	10-Year	50-Year	100-Year	500-Year
WALNUT CREEK									
WC2	300000	11330	15770	23390	30980	757.4	759.9	761.3	764.7
WC6	299700	11330	15770	23390	30980	758.6	761.0	762.4	765.3
WC8	297100	11330	15770	23390	30980	759.5	761.7	763.3	766.0
WC10	295300	11330	15770	23390	30980	760.6	762.6	764.2	766.8
WC12	293000	11330	15770	23390	30980	761.5	763.4	765.1	767.5
WC14	290800	11330	15770	23390	30980	765.0	767.2	769.7	771.4
WC16	289420	11330	15770	23390	30980	766.2	768.6	771.2	772.7
WC18	285170	11330	15770	23390	30980	768.5	770.0	772.3	773.8
WC20	281640	8920	12450	18330	24100	770.9	772.1	773.9	775.2
WC22	279090	8920	12450	18330	24100	773.1	774.1	775.6	776.8
WC26	277940	8920	12450	18330	24100	776.9	777.4	778.0	778.8
WC28	275290	8920	12450	18330	24100	777.7	778.4	779.3	780.2
WC30	270070	8920	12450	18330	24100	781.8	782.9	784.1	785.0
WC36	269375	8500	12000	17900	23700	784.9	787.2	788.7	792.2
WC38	267655	8500	12000	17900	23700	785.8	787.8	789.4	792.6
WC42	265325	7960	11200	16520	21540	788.3	790.5	791.4	793.5
WC44	263405	7960	11200	16520	21540	789.5	791.6	792.8	794.4
WC46	258905	7960	11200	16520	21540	793.9	795.1	796.5	797.6
WC48	255555	7500	10800	16100	21100	797.7	798.9	800.2	801.3
WC52	255125	7500	10800	16100	21100	800.7	801.4	803.2	804.0
WC54	253275	6650	9400	13420	17140	802.0	803.0	804.5	805.5
WC56	250865	6650	9400	13420	17140	804.4	805.4	806.7	807.6

Cross Section	Station (FT)	Peak Discharge (CFS) Flood Frequency				Water Surface Elevation (Feet MSL) Flood Frequency			
		10-Year	50-Year	100-Year	500-Year	10-Year	50-Year	100-Year	500-Year
WC60	249965	6650	9400	13420	17140	805.3	806.3	807.5	808.5
WC64	245515	6650	9400	13420	17140	809.8	810.9	812.2	813.2
WC66	243995	6650	9400	13420	17140	811.1	812.2	813.4	814.4
WC68	242495	6650	9400	13420	17140	812.6	813.6	814.7	815.6
WC72	242075	6650	9400	13420	17140	813.6	814.5	815.6	816.5
WC74	238255	6650	9400	13420	17140	818.0	819.3	820.9	822.1
WC76	233975	6530	9240	13190	16810	822.9	824.1	825.5	826.6
WC80	231565	6530	9240	13190	16810	826.1	827.3	828.8	829.8
WC81	228675	6530	9240	13190	16810	829.7	831.0	832.5	833.6
WC82	222525	6530	9240	13190	16810	836.8	838.0	839.4	840.5
WC86	220405	6530	9240	13190	16810	839.0	840.8	843.2	844.6
WC88	218475	4890	6880	9770	12280	841.0	842.6	844.7	846.1
WC90	215815	4890	6880	9770	12280	842.8	844.0	845.8	847.0
WC91	213765	4890	6880	9770	12280	844.5	845.6	847.1	848.3
WC96	210120	4890	6880	9770	12280	848.7	849.8	851.7	852.9
WC98	206820	4890	6880	9770	12280	851.2	852.3	853.8	854.8
WC100	204040	4800	6810	9730	12230	854.0	855.2	856.6	857.8
WC102	201720	4800	6810	9730	12230	855.8	857.1	858.6	859.8
WC104	200210	4800	6810	9730	12230	856.9	858.0	859.5	860.6
WC106	198260	4800	6810	9730	12230	858.3	859.5	861.0	862.0
WC110	198010	4800	6810	9730	12230	859.1	860.6	862.0	862.9
WC112	196510	3420	4840	6680	8370	860.2	861.5	862.9	863.9
WC114	193430	3420	4840	6680	8370	862.5	863.3	864.5	865.3
WC116	190180	3420	4820	6680	8370	865.4	866.1	867.0	867.7

Cross Section	Station (FT)	Peak Discharge (CFS) Flood Frequency				Water Surface Elevation (Feet MSL) Flood Frequency			
		10-Year	50-Year	100-Year	500-Year	10-Year	50-Year	100-Year	500-Year
WC120	188760	3420	4820	6680	8370	867.1	868.4	869.2	870.6
WC122	187660	3420	4820	6680	8370	868.2	869.4	870.3	871.6
LITTLE WALNUT CREEK									
LW2	196540	2360	3420	4820	6150	860.2	861.5	863.0	864.0
LW4	194310	2360	3420	4820	6150	861.8	863.0	864.3	865.3
LW8	192110	2360	3420	4820	6150	863.0	864.1	865.4	866.3
LW10	189960	2360	3420	4820	6150	864.9	865.9	866.9	867.7
LW14	188110	2360	3420	4820	6150	867.1	867.8	868.7	869.3
LW16	185710	2310	3360	4700	5920	871.0	871.8	872.7	873.4
LW18	184400	2310	3360	4700	5920	872.0	872.8	873.8	874.5
LW22	182710	2000	2760	4000	5000	874.1	874.9	875.8	876.5
LW26	181870	2000	2760	4000	5000	875.9	876.7	877.7	878.4
LW28	179870	1400	2000	2720	3390	879.6	880.4	881.1	881.7
LW32	178890	1400	2000	2720	3390	884.3	884.9	885.3	885.6
LW34	177000	1400	2000	2720	3390	889.6	890.2	891.0	891.6
POPLAR CREEK									
PC2	252545	2840	4250	6150	7870	805.0	806.0	807.3	808.1
PC6	251445	2840	4250	6150	7870	807.2	808.7	810.0	810.8
PC10	251045	2840	4250	6150	7870	808.5	810.1	811.2	812.0
PC12	248485	2840	4250	6150	7870	814.6	816.0	817.0	817.7
PC14	244535	2840	4250	6150	7870	825.4	826.7	827.6	828.1
PC16	243445	2650	3970	5370	7330	829.2	830.6	831.9	832.6

Cross Section	Station (FT)	Peak Discharge (CFS) Flood Frequency				Water Surface Elevation (Feet MSL) Flood Frequency			
		10-Year	50-Year	100-Year	500-Year	10-Year	50-Year	100-Year	500-Year
PC20	243065	2650	3970	5730	7330	830.8	834.3	837.1	838.6
PC22	240115	2650	3970	5730	7330	839.9	841.0	842.4	843.4
PC26	238795	2650	3970	5730	7330	843.6	844.7	845.9	846.7
PC28	237095	2650	3970	5730	7330	849.6	850.5	851.4	852.0
PC30	235895	2480	3700	5400	6950	852.5	853.7	855.0	855.9
PC34	235205	2480	3700	5400	6950	854.4	856.2	858.3	859.7
PC36	232910	2480	3700	5400	6950	862.3	863.5	864.9	866.1
PC38	229260	2210	3300	4800	6220	874.2	875.2	876.5	877.6
PC40	227650	2210	3300	4800	6220	882.0	883.1	884.3	885.2
PC42	226190	1980	2960	4280	5460	887.6	889.0	890.2	890.9
PC46	225580	1980	2960	4280	5460	889.5	891.6	892.5	893.0
PC48	223160	1980	2960	4280	5460	900.0	900.9	901.8	902.4
PC50	220830	1980	2960	4280	5460	907.6	908.7	909.7	910.5
PC52	219330	1980	2960	4280	5460	913.4	914.0	914.9	915.4
PC56	218910	900	1400	2000	2600	914.5	915.2	916.0	916.5
PC60	217510	900	1400	2000	2600	921.0	921.9	922.8	923.4
PC64	215380	900	1400	2000	2600	932.1	933.1	934.0	934.7
PC68	214610	900	1400	2000	2600	936.2	937.4	938.5	939.5
PC70	212470	900	1400	2000	2600	950.2	951.2	952.1	952.8
PAWPAW CREEK									
PP2	217565	2830	4150	5950	7590	842.2	843.6	845.3	846.6
PP4	216715	2830	4150	5950	7590	844.3	845.4	846.6	847.6

Cross Section	Station (FT)	Peak Discharge (CFS) Flood Frequency				Water Surface Elevation (Feet MSL) Flood Frequency			
		10-Year	50-Year	100-Year	500-Year	10-Year	50-Year	100-Year	500-Year
PP8	216535	2830	4150	5950	7590	844.7	845.8	848.1	849.1
PP10	215825	1560	2260	3220	4090	849.1	849.9	851.2	852.1
PP12	215275	1560	2260	3220	4090	849.2	850.1	851.4	852.3
PP16	214595	1560	2260	3220	4090	850.6	852.6	855.7	856.3
PP20	213790	1560	2260	3220	4090	855.9	861.5	868.9	875.5
PP22	211990	1560	2260	3220	4090	856.8	861.8	869.0	875.5
PP24	210370	1560	2260	3220	4090	860.2	863.1	869.2	875.6
PP26	207990	1140	1670	2370	3020	867.5	868.9	871.6	876.1
PAWPAW CREEK TRIBUTARY									
PPT2	209810	620	890	1270	1590	862.4	864.4	869.3	875.6
PPT4	209100	620	890	1270	1590	864.2	865.8	869.5	875.6
BALTIMORE TRIBUTARY									
BT4	215935	1270	1890	2730	3490	846.8	847.7	849.3	850.3
BT6	215375	1270	1890	2730	3490	847.4	848.5	849.9	850.9
BT10	214795	1270	1890	2730	3490	848.9	850.2	852.0	853.6
BT12	212995	1270	1890	2730	3490	852.9	854.0	855.2	856.2
BT14	210645	1270	1890	2730	3490	861.6	862.5	863.5	864.2
BT16	209295	1270	1890	2730	3490	866.5	867.7	868.6	869.4

Cross Section	Station (FT)	FLOOD FREQUENCY 10-YEAR Head Water Elev.	10-YEAR Tail Water Elev.	10-YEAR Head Loss (ft)	10-YEAR Q (CFS)	50-YEAR Head Water Elev.	50-YEAR Tail Water Elev.	50-YEAR Head Loss (ft)	50-YEAR Q (CFS)	100-YEAR Head Water Elev.	100-YEAR Tail Water Elev.	100-YEAR Head Loss (ft)	100-YEAR Q (CFS)	500-Year Head Water Elev.	500-Year Tail Water Elev.	500-Year Head Loss (ft)	500-Year Q (CFS)
WALNUT CREEK																	
WC4	299875	758.5	757.4	1.1	11330	761.0	759.9	1.1	15770	762.3	761.3	1.0	23390	765.3	764.7	0.6	30980
WC24	278190	776.8	773.7	3.1	8920	777.3	774.7	2.6	12450	777.9	776.1	1.8	18330	778.7	777.3	1.4	24100
WC32	269870	782.5	782.0	0.5	8500	783.9	783.0	0.9	12000	786.2	784.3	1.9	17900	788.7	785.2	3.5	23700
WC34	269670	784.9	782.6	2.3	8500	787.2	784.0	3.2	12000	788.7	786.3	2.4	17900	792.1	788.7	3.4	23700
WC40	265605	788.1	786.9	1.2	7960	790.4	788.7	1.7	11200	791.4	790.4	1.0	16520	793.5	793.2	0.3	21540
WC50	255255	800.7	798.2	2.5	7500	801.4	799.3	2.1	10800	803.2	800.6	2.6	16100	804.0	801.6	2.4	21100
WC58	250565	804.9	804.7	0.2	6650	805.9	805.7	0.2	9400	807.1	806.9	0.2	13420	808.1	807.9	0.2	17140
WC62	245615	809.8	809.5	0.3	6650	810.8	810.6	0.2	9400	812.1	811.8	0.3	13420	813.1	812.7	0.4	17140
WC70	242385	813.5	812.9	0.6	6650	814.4	813.8	0.6	9400	815.4	814.9	0.5	13420	816.3	815.8	0.5	17140
WC78	231975	825.9	824.5	1.4	6530	827.1	825.7	1.4	9240	828.6	827.2	1.4	13190	829.6	828.3	1.3	16810
WC84	220505	839.0	838.0	1.0	6530	840.8	839.4	1.4	9240	843.2	841.0	2.2	13190	844.6	842.2	2.4	16810
WC92	213570	845.8	844.7	1.1	4890	846.7	845.9	0.8	6880	849.1	847.3	1.8	9770	850.7	848.4	2.3	12280
WC108	198160	859.1	858.4	0.7	4800	860.6	859.6	1.0	6810	862.0	861.1	0.9	9730	862.9	862.2	0.7	12230
WC118	189180	866.8	866.0	0.8	3420	868.2	866.7	1.5	4840	868.9	867.6	1.3	6680	870.3	868.3	2.0	8370
LITTLE WALNUT CREEK																	
LW6	192610	862.5	862.4	0.1	2360	863.6	863.5	0.1	3420	865.0	864.9	0.1	4820	866.0	865.8	0.2	6150
LW12	189660	865.4	865.2	0.2	2360	866.3	866.1	0.2	3420	867.3	867.1	0.2	4820	868.1	867.9	0.2	6150
LW20	184200	872.3	872.2	0.1	2000	873.0	873.0	0.0	2760	874.0	873.9	0.1	4000	874.7	874.6	0.1	5000
LW24	182610	874.6	874.3	0.3	2000	875.4	875.1	0.3	2760	876.3	875.9	0.4	4000	877.1	876.7	0.4	5000
LW30	178990	864.3	882.3	2.0	1400	884.8	882.9	1.9	2000	885.2	883.5	1.7	2720	885.5	884.1	1.4	3390

Cross Section	Station (FT)	FLOOD FREQUENCY 10-YEAR Head Water Elev.	10-YEAR Tail Water Elev.	10-YEAR Head Loss (ft)	10-YEAR Q (CFS)	50-YEAR Head Water Elev.	50-YEAR Tail Water Elev.	50-YEAR Head Loss (ft)	50-YEAR Q (CFS)	100-YEAR Head Water Elev.	100-YEAR Tail Water Elev.	100-YEAR Head Loss (ft)	100-YEAR Q (CFS)	500-Year Head Water Elev.	500-Year Tail Water Elev.	500-Year Head Loss (ft)	500-Year Q (CFS)
POPLAR CREEK																	
PC4	251845	806.2	806.1	0.1	2840	808.2	807.2	1.0	4250	809.5	808.5	1.0	6150	810.3	809.3	1.0	7870
PC8	251145	808.2	808.2	0.0	2840	809.9	809.5	0.4	4250	811.0	810.6	0.4	6150	811.8	811.4	0.4	7870
PC18	243345	830.1	829.6	0.5	2650	834.3	831.1	3.2	3970	837.1	832.4	4.7	5730	838.6	833.3	5.3	7330
PC24	240015	841.5	840.4	1.1	2650	842.9	841.5	1.4	3970	844.2	842.7	1.5	5730	845.2	843.7	1.5	7330
PC32	235375	854.2	853.6	0.6	2480	856.1	854.9	1.2	3700	858.2	856.3	1.9	5400	859.6	857.4	2.2	6950
PC44	225980	888.7	888.2	0.5	1980	891.2	889.7	1.5	2960	892.1	891.0	1.1	4280	892.6	891.7	0.9	5460
PC54	219110	914.3	913.9	0.4	900	914.9	914.5	0.4	1400	915.7	915.3	0.4	2000	916.2	915.8	0.4	2600
PC58	218110	917.1	917.1	0.0	900	918.5	918.0	0.5	1400	919.4	918.9	0.5	2000	920.0	919.5	0.5	2600
PC62	216890	926.0	925.5	0.5	900	927.0	926.3	0.7	1400	927.8	927.0	0.8	2000	928.4	927.8	0.6	2600
PC66	214900	934.7	934.7	0.0	900	935.7	935.7	0.0	1400	936.5	936.5	0.0	2000	937.2	937.2	0.0	2600
PAWPAW CREEK																	
PP6	216585	844.7	844.7	0.0	2830	845.7	845.7	0.0	4150	848.2	846.8	1.4	5950	849.2	847.7	1.5	7590
PP14	215175	850.5	849.2	1.3	1560	852.4	850.1	2.3	2260	855.6	851.4	4.2	3220	856.2	852.3	3.9	4090
PP18	214170	855.9	850.8	5.1	1560	861.5	852.7	8.8	2260	868.9	855.7	13.2	3220	875.4	856.3	19.1	4090
BALTIMORE TRIBUTARY																	
BT2	216035	846.8	845.7	1.1	1270	847.8	847.0	0.8	1890	849.3	849.1	0.2	2730	850.3	850.2	0.1	3490
BT8	214895	848.7	847.9	0.8	1270	850.2	849.0	1.1	1890	852.0	850.5	1.5	2730	853.6	851.5	2.1	3490

CROSS SECTION NUMBER	FLOODWAY *--WIDTH IN FEET--* LEFT	RIGHT	TOTAL	AREA (SQ.FT.)	MEAN VELOCITY (FT/SEC.)	WATER SURFACE ELEV.	100-YEAR PRES. COND. ELEV.
WC2	69	946	1015	11477	2.0	762.3	761.3
WC6	66	1137	1203	13418	1.7	763.4	762.4
WC8	371	692	1063	11401	2.1	764.3	763.3
WC10	400	471	871	8558	2.7	765.2	764.2
WC12	97	825	922	9676	2.4	766.1	765.1
WC14	70	224	294	2614	8.9	770.7	769.7
WC16	498	1298	1796	19975	1.2	772.2	771.2
WC18	136	1520	1656	14224	1.6	773.3	772.3
WC20	785	463	1248	9407	1.9	774.9	773.9
WC22	92	1123	1215	8173	2.2	776.6	775.6
WC26	52	1330	1382	10577	1.7	779.0	778.0
WC28	514	1000	1514	9520	1.9	780.3	779.3
WC30	235	803	1038	6697	2.7	785.1	784.1
WC36	465	761	1226	11680	1.5	789.7	788.7
WC38	324	466	790	7327	2.4	790.4	789.4
WC42	45	238	283	2943	5.6	792.4	791.4
WC44	397	490	887	7313	2.3	793.8	792.8
WC46	192	648	840	5877	2.8	797.5	796.5
WC48	632	75	707	4855	3.3	801.2	800.2
WC52	634	391	1025	9451	1.7	804.2	803.2
WC54	449	158	607	4523	3.0	805.5	804.5
WC56	55	828	883	5600	2.4	807.7	806.7
WC60	569	55	624	4232	3.2	808.5	807.5

CROSS SECTION NUMBER	FLOODWAY *--WIDTH IN FEET--* LEFT	RIGHT	TOTAL	AREA (SQ.FT.)	MEAN VELOCITY (FT/SEC.)	WATER SURFACE ELEV.	100-YEAR PRES. COND. ELEV.
WC64	615	62	677	4895	2.7	813.2	812.2
WC66	408	287	695	4570	2.9	814.4	813.4
WC68	329	555	884	4992	2.7	815.7	814.7
WC72	150	48	198	1899	7.1	816.6	815.6
WC74	83	304	387	3323	4.0	821.9	820.9
WC76	433	120	553	3674	3.6	826.5	825.5
WC80	251	44	295	2363	5.6	829.8	828.8
WC81	302	54	356	2980	4.4	833.5	832.5
WC82	464	37	501	3844	3.4	840.4	839.4
WC86	36	286	322	3879	3.4	844.2	843.2
WC88	55	666	721	4861	2.0	845.7	844.7
WC90	172	531	703	5177	1.9	846.8	845.8
WC91	215	236	451	3222	3.0	848.1	847.1
WC96	216	262	478	3745	2.6	852.7	851.7
WC98	343	209	552	4377	2.2	854.8	853.8
WC100	50	209	259	2426	4.0	857.6	856.6
WC102	126	294	420	3740	2.6	859.6	858.6
WC104	530	31	561	4443	2.2	860.5	859.5
WC106	42	354	396	3193	3.0	862.0	861.0
WC110	153	223	376	3333	2.9	863.0	862.0
WC112	63	325	388	3251	2.1	863.9	862.9
WC114	509	118	627	3627	1.8	865.5	864.5
WC116	96	466	562	3059	2.2	868.0	867.0

CROSS SECTION NUMBER	FLOODWAY *--WIDTH IN FEET--* LEFT	RIGHT	TOTAL	AREA (SQ.FT.)	MEAN VELOCITY (FT/SEC.)	WATER SURFACE ELEV.	100-YEAR PRES. COND. ELEV.
WC120	104	230	334	2343	2.9	870.2	869.2
WC122	25	304	329	2267	2.9	871.3	870.3
PP2	343	64	407	2892	2.1	846.3	845.3
PP4	266	267	533	1965	3.0	847.6	846.6
PP8	38	38	76	818	7.3	849.1	848.1
PP10	28	187	215	1373	2.3	852.2	851.2
PP12	75	89	164	1529	2.1	852.4	851.4
PP16	164	106	270	2820	1.1	856.7	855.7
PP20	91	176	267	6617	0.5	869.9	868.9
PP22	85	111	196	3382	1.0	870.0	869.0
PP24	81	110	191	2164	1.5	870.2	869.2
PP26	39	49	88	728	3.3	872.6	871.6
PPT2	45	33	78	662	1.9	870.3	869.3
PPT4	45	102	147	1007	1.3	870.5	869.5
BT4	42	38	80	564	4.8	850.3	849.3
BT6	26	53	79	719	3.8	850.9	849.9
BT10	175	512	687	4075	0.7	853.0	852.0
BT12	56	29	85	608	4.5	856.2	855.2
BT14	50	50	100	516	5.3	864.5	863.5
BT16	38	23	61	398	6.9	869.6	868.6
LW2	66	198	264	2489	1.9	864.0	863.0
LW4	94	205	299	2281	2.1	865.3	864.3
LW8	193	137	330	2212	2.2	866.4	865.4

CROSS SECTION NUMBER	FLOODWAY *--WIDTH IN FEET--* LEFT	RIGHT	TOTAL	AREA (SQ.FT.)	MEAN VELOCITY (FT/SEC.)	WATER SURFACE ELEV.	100-YEAR PRES. COND. ELEV.
LW10	263	204	467	2873	1.7	867.9	866.9
LW14	200	261	461	2641	1.8	869.7	868.7
LW16	41	242	283	1722	2.7	873.7	872.7
LW18	51	395	446	2723	1.7	874.8	873.8
LW22	83	138	221	1265	3.2	876.8	875.8
LW26	46	88	134	879	4.5	878.7	877.7
LW28	76	77	153	792	3.4	882.1	881.1
LW32	25	134	159	899	3.0	886.3	885.3
LW34	60	33	93	522	5.2	892.0	891.0
PC2	28	157	185	1213	5.1	808.3	807.3
PC6	40	255	295	1816	3.4	811.0	810.0
PC10	118	84	202	1440	4.3	812.2	811.2
PC12	140	42	182	1147	5.4	818.0	817.0
PC14	87	87	174	1154	5.3	828.6	827.6
PC16	38	39	77	642	8.9	832.9	831.9
PC20	53	397	450	3524	1.6	838.1	837.1
PC22	35	158	193	1227	4.7	843.4	842.4
PC26	158	41	199	1339	4.3	846.9	845.9
PC28	170	56	226	1262	4.5	852.4	851.4
PC30	30	48	78	635	8.5	856.0	855.0
PC34	58	540	598	3920	1.4	859.3	858.3
PC36	30	65	95	770	7.0	865.9	864.9
PC38	76	77	153	948	5.1	877.5	876.5

CROSS SECTION NUMBER	FLOODWAY *--WIDTH IN FEET--* LEFT	RIGHT	TOTAL	AREA (SQ.FT.)	MEAN VELOCITY (FT/SEC.)	WATER SURFACE ELEV.	100-YEAR PRES. COND. ELEV.
PC40	52	53	105	722	6.7	885.3	884.3
PC42	32	33	65	561	7.6	891.2	890.2
PC46	52	52	104	849	5.0	893.5	892.5
PC48	32	114	146	860	5.0	902.8	901.8
PC50	51	32	83	616	7.0	910.7	909.7
PC52	33	197	230	1000	4.3	915.9	914.9
PC56	48	25	73	466	4.3	917.0	916.0
PC60	28	29	57	320	6.2	923.8	922.8
PC64	23	24	47	291	6.9	935.0	934.0
PC68	27	27	54	324	6.2	939.5	938.5
PC70	18	19	37	249	8.0	953.1	952.1

APPENDIX D

Investigations and Analyses

Field surveys used in this study were conducted at various times during 1981 and 1982 by the local sponsors and SCS personnel. The vertical control work to establish benchmarks was done in June and July 1981 and required a total of 67 miles of bench level circuits. The road and bridge sections were also surveyed at this time. The bench level circuits were closed to third order accuracy (error, in feet, less than or equal to 0.05 times the square root of the circuit length, in miles). All elevations are referenced from the National Geodetic Vertical Datum (NGVD) of 1929, formerly referred to as Sea Level Datum of 1929. The location of the elevation reference marks are indicated on the flood hazard area maps with descriptions included in this appendix.

The valley cross sections were surveyed during the fall of 1981 and the spring of 1982. A total of 134 cross sections were surveyed. All cross sections were surveyed by transit and stadia methods.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were developed using the procedure found in Reference 12 and were based on field observations of the streams and flood plain areas. They range in value as shown below:

Stream	Channel "n"	Overbank "n"
Walnut Creek	0.037 - 0.046	0.060 - 0.095
Poplar Creek	0.041 - 0.046	0.072 - 0.092
Pawpaw Creek	0.045 - 0.049	0.075 - 0.100
Pawpaw Creek Tributary	0.050	0.080
Baltimore Tributary	0.039 - 0.050	0.060 - 0.100
Little Walnut Creek	0.035 - 0.046	0.060 - 0.090

Future land use conditions were estimated by the local sponsors considering developmental changes. Flood discharges were established by valley flood routings computed through use of the SCS watershed model "Project Formulation Hydrology, TR-20" (Reference 3). This program uses the convex method for stream and valley flood routing. This model was calibrated to match the discharges used at the lower end for the previously completed Canal Winchester Flood Insurance Study (Reference 9).

The SCS water surface profile program, WSP-2 (step backwater method), was used to determine water surface elevations for the range of discharges utilizing roughness coefficients and surveyed cross sections (Reference 4). Computed profiles were compared to high water marks and found to agree closely.

The hydraulic analyses for this study were based on unobstructed flow. No consideration was made for bridge or culvert openings blocked by debris, ice, flood plain filling, or other encroachments which could affect the water surface profiles. Computations for this study considered only those features in the flood plain at the time the field surveys were made.

The floodway width was computed using the Floodway Determination Commputer Program (SCS TR-64) (Reference 5). The floodway width was determined by decreasing the conveyance (ability of the flood plain to carry water) on each side of the channel by equal amounts, for each valley cross section, until an increased depth of flow of one foot was obtained (See Appendix C-4).

The flood plain and floodway boundaries were delineated on topographic maps and transposed to the aerial photomosaics using the width of the flood plain and floodway at each surveyed cross section and interpolating along contours between cross sections. U.S.G.S topographic maps were used for this purpose. The photomosaics were made from aerial photos supplied by ASCS.

The inventory of the natural values of the watershed was obtained through a literature search, personal contacts with ODNR personnel, and a reconnaissance field survey of the area.

The economic analysis was based on flood plain areas as determined by SCS hydrologists, land use and urban evaluation by field observation and discussion with the SCS district conservationist for Fairfield County. Crop values were estimated from results of completed analyses of similar watersheds.

BENCHMARKS

BM WC4 Elevation 736.69

Chiseled square on northeast corner of west concrete curb (downstream) of bridge over Walnut Creek on Lithopolis-Winchester Road, 0.9' above road surface, 12' downstream from center line of road and 2' east of downstream guard rail.

BM WC14 Elevation 769.12

Mine dolly spike on west side of power pole No. TCA 38 which is the second pole north of Walnut Creek on top of old abandoned railroad grade and is 0.8 mile southeast of Waterloo.

BM WC24 Elevation 779.71

Chiseled X at north end of northwest (right D.S.) stone wingwall of bridge over Walnut Creek on Pickerington Road, 9' west of center line road and 9' north of end of bridge at road level and 0.4 mile northwest of Lockville.

BM WC34 Elevation 781.65

Chiseled square on northeast corner of east end of south abutment of north bound bridge of U.S. Route 33 bridge over Walnut Creek 0.6' above and 20' east of center line of road.

BM WC40 Elevation 779.34

Chiseled square on west end of south (left downstream) concrete abutment of bridge over Walnut Creek on Carroll Northern road 0.3' below and 13' west of center line of road.

BM WC50 Elevation 801.34

Chiseled square on west end of 6" X 8" angle iron used as south abutment (left downstream) of bridge over Walnut Creek on Coakley Road 1.8' below and 15' west of center line of road.

BM WC58 Elevation 806.80

Chiseled square on east end of south steel angle iron piling cap used for abutment (left upstream) 2' below and 14' east of center line of road on bridge over Walnut Creek on Havensport Road.

BM WC70 Elevation 814.04

Chiseled square on extreme north end of northwest (right downstream) stone wingwall of bridge over Walnut Creek on Bader Road; 16' west of and 2' below center line of road and 25' north of north end of bridge.

BM WC78 Elevation 826.84

Chiseled X on southeast stone wingwall (left downstream) of closed covered bridge on Leonard Road over Walnut Creek 1' below and 12' downstream of center line of road.

BM WC84 Elevation 840.68

Chiseled square on southeast corner of east end (right upstream) of north steel abutment of bridge over Walnut Creek on Basil Road, 2.1' below road surface and 2' east of east edge of bridge.

BM WC92 Elevation 850.17

Chiseled square on east end (right upstream) of north concrete abutment of bridge over Walnut Creek on State Route 158, 22' east of and 0.5' above center line of road.

BM WC98 Elevation 866.32

Mine dolly spike 1' above ground on west side of corner post on east side of drive into an Ohio Power Company transformer station on south side of Leonard Road and 0.8 mile east of State Route 158.

BM WC108 Elevation 862.05

Chiseled square on northeast corner (right upstream) of north concrete abutment of bridge over Walnut Creek on State Route 37. Bridge No. FA1 37 0736.

BM WC118 Elevation 871.21

Ohio Department of Transportation standard disc set in southeast concrete abutment (left downstream) of bridge over Walnut Creek on State Route 256, 0.5 mile west of Thurston.

BM LW6 Elevation 861.35

Chiseled square on north end of east (right downstream) concrete abutment of bridge over Little Walnut Creek on Leitnaker Road, 11' north of and 0.2' below center line of road.

BM LW12 Elevation 865.95

Chiseled X on west end of north (right downstream) stone abutment of bridge over Little Walnut Creek on Old Millersport Road, 8' west of and 0.3' below center line of road.

BM LW20 Elevation 873.30

Top of rivet head at extreme northwest corner of bridge (left downstream) over Little Walnut Creek on Pleasantville Road; northern most rivet of 2, 0.8' below road surface and 2" south of north edge of girder.

BM LW30 Elevation 884.14

Chiseled square on northwest corner of northwest (right downstream) concrete abutment of bridge over Little Walnut Creek on State Route 188 at south edge of Pleasantville, 3' west of west edge of bridge and 0.2' below road level. Bridge No. FAI 188 2183.

BM PC4 Elevation 812.37

Chiseled square on northwest corner of northwest (right downstream) stone abutment of bridge over Poplar Creek on Havensport Road, 9' west of and 0.3' below center line of road.

BM PC18 Elevation 840.26

Chiseled X on top of steel I beam supporting guard rail post at northwest corner (right upstream) of bridge over Poplar Creek on Basil Western Road, 0.7' below road surface and directly under guard rail.

BM PC24 Elevation 865.01

Chiseled X on south end of west (right downstream) concrete abutment of Conrail bridge over Poplar Creek; 6' south of and 1' below south rail.

BM PC32 Elevation 860.32

Chiseled X on northwest end (right upstream) of concrete abutment of bridge over Poplar Creek on State Route 256 at road level and 1.7' north of north edge of bridge.

BM PC54 Elevation 918.59

Chiseled X on northeast end (left upstream) of 4" steel angle iron abutment of bridge over Poplar Creek on Stemen Road, 0.7' north of north edge of bridge and 0.3' below bridge surface.

BM PC58 USGS U.E. Elevation 922.37

2.8 mile northwest of Basil on State Route 256, thence 2.3 mile north to a small bridge over Poplar Creek, 35' north, 15' west and 2' lower than bridge, a chiseled square.

BM PC66 Elevation 940.70

Top of concrete used to set a USGS BM, which has been destroyed, on southwest stone wingwall (left downstream) of abandoned covered bridge over Poplar Creek on unnamed road, 0.4' mile south of State Route 204.

BM PC70 Elevation 960.16

Chiseled square on southwest corner of north concrete curb (right upstream) of bridge over Poplar Creek on State Route 204, 1.3' above bridge surface and 12' north of center line of road.

BM BT8 Elevation 864.82

Top of bolt head at southwest corner (right downstream) in top of wood beam girder, 5.5' south of south rail and 4.9' east of west end of beam of Penn Central railroad bridge over Baltimore Tributary west of Baltimore paper mill.

BM BT16 Elevation 872.37

Chiseled X at end of southwest (right upstream) concrete wingwall of bridge over Baltimore Tributary on Roley Road, 0.2' below road level and 6' from south end of bridge.

BM PP14 Elevation 861.53

Chiseled square on northwest corner of northwest stone wingwall (right downstream) of bridge over Pawpaw Creek on North Main Street in Baltimore, 24' west of and level with center line of road.

BM PPT4 Elevation 866.28

Top of bolt at top of first full corrugation on southeast end (upstream) of structure plate culvert in Pawpaw Creek Tributary under Cherry Lane Road.

APPENDIX E

GLOSSARY

GLOSSARY

Benchmark: A permanent physical mark of known elevation.

Conveyance: A measure of the water carrying capacity of the valley and/or channel section.

C.F.S.: Cubic feet per second. Used to describe the amount of flow passing a given point in a stream channel. One cubic foot per second is equivalent to approximately 7.5 gallons per second.

Cross Section: A graph or plot of ground elevation across a stream valley or a portion of it, usually along a line perpendicular to the stream or direction of flow.

Discharge: The rate of flow or volume per unit of time. Usually expressed in cubic feet per second.

Flood: An overflow of lands not normally covered by water and that are useable or used by man. The inundation of the land is temporary and the land is adjacent to or inundated by overflow from a stream or river.

Flood Frequency: The percent chance of occurrence of a flood; e.g., a 100-year flood frequency would have a one percent chance of being equalled or exceeded in any given year and would be expected to occur on the average of once in 100-years.

Floodplain: The relatively flat area or low lands adjoining the channel of a river, stream, or water course, which has been or may be covered by flood waters.

Floodway: The minimum width of water course required to carry the existing condition 100-year flood when the water surface is raised 1.0 foot.

Headwater Elevations: The elevation of the water surface above mean sea level on the upstream side of the bridge.

Photo-mosaic: Aerial photographs put together to form the desired photographic coverage of the stream reach.

Profile: A graph or plot of the water surface elevation against distance along a channel. Also termed "flood profile" if drawn for a specific flood or level of flooding.

Recurrence Interval: A statistical expression of the average time between floods equalling or exceeding a given magnitude (see flood frequency).

Subarea: A part of a larger watershed having its own watershed boundaries within or coincident to the main watershed.

Tailwater Elevation: The elevation above mean sea level of the water surface on the downstream side of the bridge.

APPENDIX F

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BIBLIOGRAPHY

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